SYSTEM OVERVIEW

Description: +24V DC @ up to 4000 amperes Power System.

This power system is designed to power a load while charging a negative grounded battery. This power system is capable of operating in a batteryless installation or off battery for maintenance purposes. The power system is designed for operation with the negative output grounded.

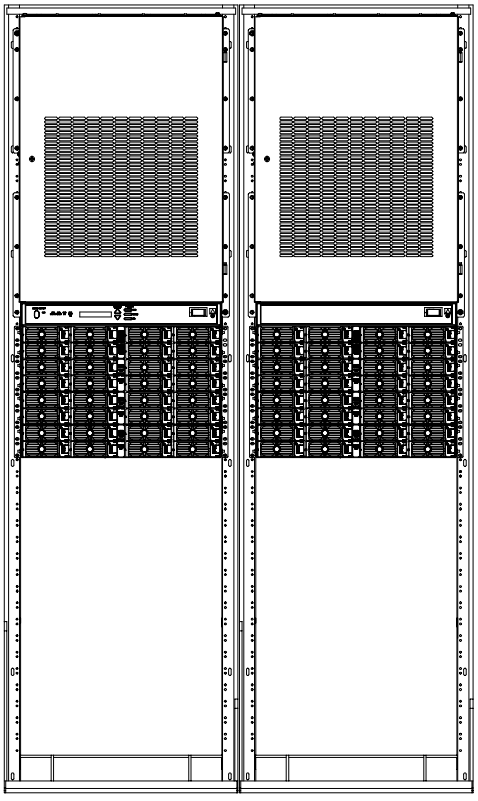
The NETSURE™ 700NVBA DC Power System is a complete integrated power system containing rectifiers (PCUs), converters, intelligent control, metering, monitoring, and distribution. This power system consists of the following components.

- **Distribution Cabinet**

  The system always includes a minimum of one Distribution Cabinet (one per bay), which provides DC distribution through fuses and/or circuit breakers.

  Four different sizes of Distribution Cabinets may be ordered to accept from one (1) to four (4) Distribution Bus Panel assemblies. A variety of Distribution Bus Panel assemblies are available that provide combinations of load distribution, battery distribution, low voltage load or battery disconnect, manual battery disconnect, and dual voltage load distribution for use with -48V converters. The Distribution Cabinet is factory mounted in the relay rack specified when ordered.

  Most of the distribution panels accept either TPS/TLS-type fuseholders or Bullet Nose-type circuit breakers. TPH-type fuses and GJ/218-type circuit breakers are also available, in ratings up to 600 amps.



- **Meter-Control-Alarm (MCA) Assembly**

  The system contains one MCA. The MCA controls the operation of the Rectifier Modules (PCUs). The MCA also provides power system control, metering, monitoring, and alarm functions.

- **Module Mounting Assembly**

  The system contains one or more Module Mounting Assemblies (one per bay), each of which houses Rectifier Modules (PCUs) and optional DC-DC Converter Modules. Refer to PD588705100 (PD588705101, PD588705102, PD588705103, PD588705104) for more information.

- **Rectifier Modules (PCUs)**

  The system contains Rectifier Modules (PCUs), which provide load power, battery float current, and battery recharge current during normal operating conditions. Refer to PD588705100 (PD588705101, PD588705102, PD588705103, PD588705104) for more information.

- **Optional DC-DC Converter Modules**

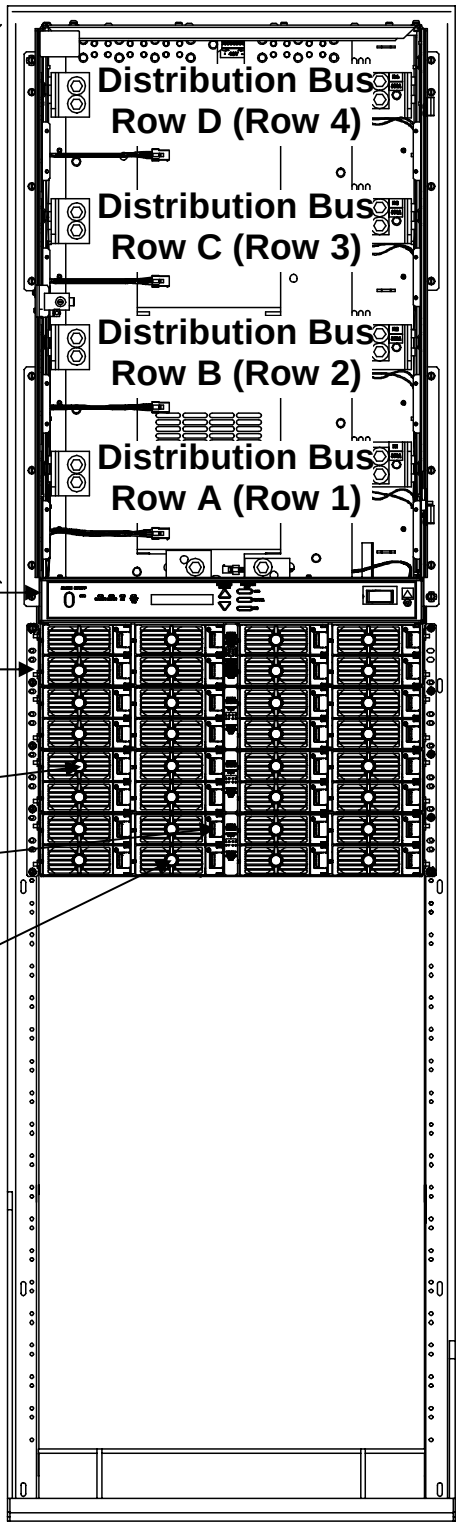
  Where –48VDC load power is also required, DC-DC Converter Modules are available. Refer to PD588705100 (PD588705101, PD588705102, PD588705103, PD588705104) for more information.

Family:	NETSURE™
Spec. No.:	581126000
Model:	700NVBA
Rectifier Input Voltage	Nominal 208-240 volts AC, single phase, 50/60 Hz, with an operating range of 180 to 264 volts. Acceptable input frequency range is 47 to 65 Hz.
Rectifier Output Voltage:	+24 Volts DC
Converter Output Voltage:	-48 Volts DC
Output Capacity:	
System:	4000 Amperes, maximum
Bay:	2000 Amperes, maximum (1500A maximum when equipped with List AH; 1200A maximum when equipped with List RA or RB)
Distribution Bus Panel:	500 Amperes, maximum (List ND rated for 960A)
Rectifier Module (PCU):	87.7A @ +28.5VDC to 104.2A @ +24.0VDC, 2500 Watts
Converter Module:	31 Amperes (1500W)
Agency Approval:	UL 1801 Listed (“c UL”), NEBS (pending)
Framework Type:	Relay Rack
Mounting Width:	23 Inches, nominal
Mounting Depth:	
Distribution Cabinet:	18 Inches (single-bay), 21 Inches (multi-bay) (List RC, RD, and RE adds 5.25 inches to back of system, see Overall Dimensions Illustrations)
Module Mounting Assembly:	22.34 Inches
Access:	Front, Sides, and Rear for Installation and Maintenance, Front for Operation
Supplemental Bay(s) Available:	One
Control:	Microprocessor
Color:	Bay and Rectifier Module Faceplates: Textured Gray (Spec. M500-147) Rectifier Shelf and Rectifier Modules Bodies: Bright Zinc Plating (Spec. M500-53)
List Options:	Main Bay, Supplemental Bay (located next to Main Bay), Supplemental Bay 'Distribution Only' Option, Supplemental Bay (located away from Main Bay), MCA (standard), MCA (special application), MCA (special application), MCA (special application), 1-Row Distribution Cabinet, 2-Row Distribution Cabinet, 3-Row Distribution Cabinet, 4-Row Distribution Cabinet, Distribution Cabinet Top Shield, Module Mounting Assembly Interface Components, Field Expansion Kit (One [1] 8-Position Module Mounting Assembly), Rectifier Module (PCU), DC-DC Converter Option Interface Component Kit, DC-DC Converter Module, Audible Alarm and Alarm Termination Card, MCA Interface Modem Option, MCA

Home

	Interface WinLink Software, MCA Interface Combination Modem/RS-232 Option, MCA Interface Ethernet Option (WinLink Compatible + Web Interface), MCA Interface Ethernet Option (WinLink Compatible + Web Interface + SNMP), MCA Interface Ethernet Option (WinLink Compatible + Web Interface + Battery Monitoring), MCA Interface Ethernet Option (WinLink Compatible + Web Interface + SNMP + Battery Monitoring), Battery Stand System, Battery Tray (Pre-Cabled), Distribution Panels
Accessories Options:	Relay Racks, Transition Plates, Distribution Devices, Wiring Components, Module Mounting Position Blank Cover Panel, Battery Charge Temperature Compensation Probe for Single Probe Digital Compensation, Battery Charge Temperature Compensation Probe Concentrator for Multiple Probe Use (TXM), Battery Busbar Extension Kit, Battery Busbar Extension Kit, Lug Adapter Busbar, Lug Adapter Busbar Kit, Lug Adapter Busbar Kit, Lug Hardware Kit, LVD Contactor Bypass Kit, Replacement Cables, Replacement Components
Environment:	-40°C to +40°C (-40°F to +104°F)

581126000



Distribution Cabinet
List 24 (4-Row)
List 23 (3-Row)
List 22 (2-Row)
List 21 (1-Row)

MCA
List 10, 11, 12, 13

Module Mounting Assembly Interface
List 30

Rectifier Module
List 50

DC-DC Converter Option Interface Component Kit
List 60

Optional DC-DC Converter Module
List 62
or
Rectifier Module
List 50

Distribution Assembly List AA, AB, AC, AD, AE, AG, AH, AJ, AK, AL, AM, BA, CA, CB, CD, CE, CF, CG, CJ, EA, GB, JA, JB, JC, JD, KA, LB, LC, NA, NB, NC, ND
List RA: LV Battery Disconnect
List RB, RC: Manual Battery Disconnect
List RD: LV/Manual Battery Disconnect
List RE: LV Battery Disconnect

Other Options

List 29: Distribution Cabinet Top Shield

List 31: Field Expansion Kit: One (1) 8-Position Module Mounting Assembly

List 71: Optional Audible Alarm and Alarm Termination Circuit Card

List 72: MCA Interface Modem Option

List 73: MCA Interface WinLink Software

List 74: MCA Interface Combination Modem/RS-232 Option

List 75: MCA Interface Ethernet Option: WinLink Compatible + Web Interface

List 76: MCA Interface Ethernet Option: WinLink Compatible + Web Interface + SNMP

List 77: MCA Interface Ethernet Option: WinLink Compatible + Web Interface + Battery Monitoring

List 78: MCA Interface Ethernet Option: WinLink Compatible + Web Interface + SNMP + Battery Monitoring

List 92: Battery Stand System

List 93: Battery Tray

See Also

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ORDERING INFORMATION

List Options

Order the following by the items Part Number as specified in the following table.

When viewing electronically, click on the *List #* to jump to the detailed description page.

List Options (Numbers)

List No.	Part Number	Description	Mounting Positions (1U = 1-3/4")	Notes
1	58112600001	Main Bay Common Equipment (Power and Distribution). Accepts Distribution Cabinet (List 21, 22, 23, or 24) with MCA (List 10, 11, 12, or 13) and Module Mounting Assembly Interface (List 30).	--	1, 2
2	58112600002	Supplemental Bay Common Equipment (Power and Distribution). Includes interbay power busbars and communication cable. Accepts Distribution Cabinet (List 23 or 24) and Module Mounting Assembly Interface (List 30).	--	1, 2
4	58112600004	"Distribution Only" option for List 2 or 5. Configures the bay for use without Module Mounting Assembly.	--	
5	58112600005	Remote Supplemental Bay Common Equipment (Power and Distribution). Includes communication cable. Requires interbay power cabling. Accepts Distribution Cabinet (List 21, 22, 23, or 24) and Module Mounting Assembly Interface (List 30).	--	1, 2
10	58112600010	MCA - Standard Application (Configuration No. 534876) (installed in Main Bay Distribution Cabinet).	--	1, 2
11	58112600011	MCA - Special Application (Configuration No. 534877) (installed in Main Bay Distribution Cabinet).	--	1, 2
12	58112600012	MCA - Special Application (Configuration No. 534878) (installed in Main Bay Distribution Cabinet).	--	1, 2
13	58112600013	MCA - Special Application (Configuration No. 534879) (installed in Main Bay Distribution Cabinet).	--	1, 2
21	58112600021	1-Row Distribution Cabinet (for use in List 1 and 5).	7U	1, 2
22	58112600022	2-Row Distribution Cabinet (for use in List 1 and 5).	11U	1, 2
23	58112600023	3-Row Distribution Cabinet (for use in List 1, 2, and 5).	15U	1, 2
24	58112600024	4-Row Distribution Cabinet (for use in List 1, 2, and 5).	19U	1, 2
29	58112600029	Top Shield for Distribution Cabinet.	--	--
30	58112600030	Interface Components for one (1) 588705101, 588705102, 588705103, or 588705104 Module Mounting Assembly.	2U to 8U	1, 2, 3
31	58112600031	Field Expansion Kit. Provides one (1) 588705100 8-Position Module Mounting Assembly and components required for field installation in a Power System.	2U	--
50	58112600050	Model R24-2500 Rectifier Module (PCU) (for use in List 30 and 31).	--	1, 2
60	58112600060	DC-DC Converter Option Interface Component Kit (for use in List 30 and 31).	--	--

List No.	Part Number	Description	Mounting Positions (1U = 1-3/4")	Notes
62	58112600062	Optional Model C24/48-1500 DC-DC Converter Module (for use in List 30 and 31).	--	--
71	58112600071	Audible Alarm and Alarm Termination Card.	--	4
72	58112600072	MCA Interface Modem Option.	--	--
73	58112600073	MCA Interface WinLink Software.	--	--
74	58112600074	MCA Interface Combination Modem/RS-232 Option.	--	--
75	58112600075	MCA Interface Ethernet Option (WinLink Compatible, Web Interface).	--	--
76	58112600076	MCA Interface Ethernet Option (WinLink Compatible, Web Interface, SNMP).	--	--
77	58112600077	MCA Interface Ethernet Option (WinLink Compatible, Web Interface, Battery Monitoring).	--	--
78	58112600078	MCA Interface Ethernet Option (WinLink Compatible, Web Interface, SNMP, Battery Monitoring).	--	--
92	58112600092	Battery Stand System	--	--
93	58112600093	Battery Tray, Pre-Cabled.	As requested	--

Notes:

1) This power system must consist of a minimum configuration of…
   (1) List 1
   (1) List 10, 11, 12, or 13
   (1) List 21, 22, 23, or 24
   (1) List 30 equipped w/ List 50's

   A maximum of one supplemental bay (List 2 or 5) may be added to the system.

2) Separately order one relay rack for **each** bay (List 1, 2, and 5). See Table 1 in the ACCESSORY DESCRIPTIONS section for available relay racks. Distribution Panels, Rectifier Modules (PCUs), Converters, and Module Mounting Assembly list options must be specified when ordering. Module Mounting Assembly must be ordered separately.

   Note: *System components may be ordered without a relay rack. When ordered without a relay rack, the system is mounted on shipping brackets bolted to a shipping skid. The shipping brackets can mount a system up to 20U high.*

3) Includes Module Mounting Assembly to Distribution Cabinet interconnect components only. Module Mounting Assembly is not included in List 30. Order Module Mounting Assembly separately per PD588705101, PD588705102, PD588705103, PD588705104.

4) Use alarm cable P/N 514327 (15' 0" cable) when List 71 is **not** ordered (List 1 provides this cable). For a longer cable, P/N 514380 (60') is available.

List Options (Letters) (Distribution Bus Arrangements)

If Low Voltage Disconnect (LVD) is required, each distribution row that is to operate from an LVD must have an LVD provided in the specific panel ordered for that row.

Rows are numbered one through four (A through D) from bottom to top.

List No.	Part Number	Description	Single or Dual Voltage	Low Volt. Load Disc.	Battery Disc.
AA	581126000AA	Distribution. (24) Bullet Nose Circuit Breaker and/or TPS/TLS Fuse +24V System Positions.	Single	No	No
AB	581126000AB	Distribution. (3) GJ/218 Circuit Breaker +24V System Positions. (rows 1, 2, 3 only)	Single	No	No
AC	581126000AC	Distribution. (3) GJ/218 Circuit Breaker +24V System Positions. (row 4 only)	Single	No	No
AD	581126000AD	Distribution. (8) GJ/218 Circuit Breaker +24V System Positions. (rows 3 and 4 [C and D])	Single	No	No
AE	581126000AE	Distribution. (8) GJ/218 Circuit Breaker +24V System Positions. (rows 1 and 2 [A and B] or rows 2 and 3 [B and C])	Single	No	No
AG	581126000AG	Distribution. (2) TPH Fuse +24V System Positions. [Need (1) List AH for up to (2) List AG if internal load returns are required.]	Single	No	No
AH	581126000AH	Ground Bar Assembly for use with up to (2) List AG, AJ, CG, or CJ if internal load returns are required.	N/A	No	No
AJ	581126000AJ	Distribution. (2) TPH Fuse +24V System Positions with Load Shunts. [Need (1) List AH for up to (2) List AJ if internal load returns are required.]	Single	No	No
AK	581126000AK	Distribution. (24) Bullet Nose Circuit Breaker and/or TPS/TLS Fuse +24V System Positions. (no ground return busbar provided)	Single	No	No
AL	581125000AL	Ground Bar Assembly for use with up to (2) List AK if internal load returns are required.	N/A	No	No
AM	581126000AM	Distribution. (20) Bullet Nose Circuit Breaker and/or TPS/TLS Fuse +24V System Positions. (1) Bullet Nose Circuit Breaker and/or TPS/TLS Fuse 3-Pole +24V Input Disconnect Position.	Single	No	No

List No.	Part Number	Description	Single or Dual Voltage	Low Volt. Load Disc.	Battery Disc.
BA	581126000BA	Distribution. (12) LVD-Controlled Bullet Nose Circuit Breaker and/or TPS/TLS Fuse +24V System Positions. (8) Non-LVD-Controlled Bullet Nose Circuit Breaker and/or TPS/TLS Fuse +24V System Positions.	Single	Yes	No
CA	581126000CA	Distribution. (20) LVD-Controlled Bullet Nose Circuit Breaker and/or TPS/TLS Fuse +24V System Positions.	Single	Yes	No
CB	581126000CB	Distribution. (3) LVD-Controlled GJ/218 Circuit Breaker +24V System Positions. (rows 1, 2, 3 only)	Single	Yes	No
CD	581126000CD	Distribution. (3) LVD-Controlled GJ/218 Circuit Breaker +24V System Positions. (row 4 only)	Single	Yes	No
CE	581126000CE	Distribution. (8) LVD-Controlled GJ/218 Circuit Breaker +24V System Positions. (rows 3 and 4)	Single	Yes	No
CF	581126000CF	Distribution. (8) LVD-Controlled GJ/218 Circuit Breaker +24V System Positions. (rows 1 and 2, or rows 2 and 3)	Single	Yes	No
CG	581126000CG	Distribution. (2) LVD-Controlled TPH Fuse +24V System Positions. [Need (1) List AH for up to (2) List CG if internal load returns are required.]	Single	Yes	No
CJ	581126000CJ	Distribution. (2) LVD-Controlled TPH Fuse +24V System Positions with Load Shunts. [Need (1) List AH for up to (2) List CJ if internal load returns are required.]	Single	Yes	No
EA	581126000EA	Distribution. (16) Bullet Nose Circuit Breaker and/or TPS/TLS Fuse +24V System Positions. (4) Bullet Nose Circuit Breaker and/or TPS/TLS Fuse +24V Battery Disconnect Positions. (row 1 or 2 only)	Single	No	Manual
GB	581126000GB	Distribution. (8) LVD-Controlled Bullet Nose Circuit Breaker and/or TPS/TLS Fuse +24V System Positions. (1) TPH Fuse +24V Battery Disconnect Position. (row 1 only)	Single	Yes	Manual
JA	581126000JA	Distribution. (4) +24V System Positions. (16) -48V Subsystem Positions. (one per system)	Dual	No	No

List No.	Part Number	Description	Single or Dual Voltage	Low Volt. Load Disc.	Battery Disc.
JB	581126000JB	Distribution. (12) +24V System Positions. (8) -48V Subsystem Positions. (one per system)	Dual	No	No
JC	581126000JC	Distribution. (14) +24V System Positions. (6) -48V Subsystem Positions. (one per system)	Dual	No	No
JD	581126000JD	Distribution. (14) +24V System Positions. (8) -48V Subsystem Positions. (one per system)	Dual	No	No
KA	581126000KA	Distribution. (4) +24V System Positions. (16) -48V Subsystem Positions. (one per system; 1st row only)	Dual	No	No
LB	581126000LB	Distribution. (8) LVD Controlled +24V System Positions. (8) -48V Subsystem Positions. (one per system)	Dual	Yes	No
LC	581126000LC	Distribution. (12) LVD Controlled +24V System Positions. (4) -48V Subsystem Positions. (one per system)	Dual	Yes	No
NA	581126000NA	Battery Disconnect. (20) Bullet Nose Circuit Breaker and/or TPS/TLS Fuse +24V Battery Disconnect Positions. (row 1 only)	Single	No	Manual
NB	581126000NB	Battery Disconnect. (3) GJ/218 Circuit Breaker +24V Battery Disconnect Positions. (row 1 only)	Single	No	Manual
NC	581126000NC	Battery Disconnect. (1) TPH Fuse +24V Battery Disconnect Position.	Single	No	Manual
ND	581126000ND	Battery Disconnect. (2) TPH Fuse +24V Battery Disconnect Positions. (row 1 only)	Single	No	Manual
RA	581126000RA	1200A Low Voltage Battery Disconnect Contactor and Control Circuit. (row 1 only)	Single	Yes	LV
RB	581126000RB	1200A Manual Battery Disconnect. (row 1 only)	Single	No	Manual
RC	581126000RC	2000A Manual Battery Disconnect .	Single	No	Manual
RD	581126000RD	2000A Low Voltage/Manual Battery Disconnect with Battery Current Monitoring.	Single	No	LV / Manual
RE	581126000RE	2000A Low Voltage Battery Disconnect with Battery Current Monitoring.	Single	No	LV

Notes:

1) Circuit breakers, fuses, and lugs should be specified for each distribution panel. Unless otherwise specified, circuit breakers are plug-in bullet nose style and fuses are TPS/TLS style with plug-in fuse block.

2) Distribution panels are limited to 500A for single-row panels (except 960A for List ND), and 1000A for double-row panels. Maximum cabinet capacity is 2000A.

Accessory Options

Order the following by the items part number as detailed in the ACCESSORY DESCRIPTIONS section.

When viewing electronically, click on the *link* to jump to the detailed description page.

Description
Relay Racks
Transition Plates to Mount Relay Rack P/N 543156 on Top of GNB Absolyte IIP Battery Stands
GMT Load Distribution Fuse Block Assembly Kit (10) GMT Fuse Positions
GMT-Type Load Distribution Fuses
Replacement Alarm, Reference, and Control Fuses
TPH-Type Fuses
GJ/218-Type Circuit Breakers
Bullet Nose-Type Circuit Breakers and Bullet Nose-Type Fuseholders e/w TPS/TLS Fuses
Wiring Components
Module Mounting Position Blank Cover Panel
Battery Charge Temperature Compensation Probe for Single Probe Digital Compensation
Battery Charge Temperature Compensation Probe Concentrator for Multiple Probe Use (TXM)
Battery Busbar Extension Kit
Battery Busbar Extension Kit
Lug Adapter Busbar for 250 Amp Bullet Nose Type Circuit Breaker
Lug Adapter Busbar Kit for 125-200 Amp Bullet Nose Type Circuit Breaker
Lug Adapter Busbar Kit for 250 Amp Bullet Nose Type Circuit Breaker
Bullet Distribution Assembly Lug Hardware Kit
LVD Contactor Bypass Kits
Replacement Cables
Replacement Components

LIST DESCRIPTIONS

List 1: Main Bay Common Equipment (Power and Distribution)

Features

- Provides common equipment for one “power and distribution” bay rated for up to 2000 amperes of distribution.
- Accepts one (1) Distribution Cabinet (options are 1-Row, 2-Row, 3-Row, or 4-Row cabinet).
- Accepts one (1) Meter-Control-Alarm (MCA) Assembly.
- Accepts one (1) Module Mounting Assembly. The Module Mounting Assembly can consist of one (1), two (2), three (3), or four (4) factory interconnected 8-position Module Mounting Shelves. Each shelf in a Module Mounting Assembly provides eight (8) mounting positions for Rectifier Modules (PCUs). When a Module Mounting Shelf within the Module Mounting Assembly is equipped with a DC-DC Converter Option Kit, the four (4) middle positions will accept either Rectifier Modules (PCUs) or +24V/-48V DC-DC Converter Modules.

Restrictions

Cannot use a List 21 or 22 in a List 1 when List 1 is used with a List 2
(List 21 and 22 are not provided with connection points for inter-bay busbars.)

Ordering Notes

1) Order a relay rack per 'Relay Racks' under ACCESSORY DESCRIPTIONS. If required, order Relay Rack Transition Plates per 'Transition Plates to Mount Relay Rack P/N 543156 on Top of GNB Absolyte IIP Batteries' under ACCESSORY DESCRIPTIONS. A ship loose option is available, as described in 'Relay Racks' under ACCESSORY DESCRIPTIONS.
2) Order one (1) List 21, 22, 23, or 24 Distribution Cabinet.
3) Order up to four (4) Distribution Bus Panels as required per 'Distribution Bus Arrangements' and the capacity of the Distribution Cabinet ordered.
4) Order one (1) List 10, 11, 12, or 13 MCA.
5) Order as required one (1) MCA Interface option per Lists 72, 74, 75, 76, 77, or 78.
Also order as required WinLink Software per List 73.
6) Order one (1) List 30 (interface components for one (1) Module Mounting Assembly). Order a Module Mounting Assembly per PD588705101/PD588705102/PD588705103/PD58805104. List 30 is factory connected to the Module Mounting Assembly ordered.
7) Order one (1) List 60 (DC-DC Converter Option Kit) for each 8-position Module Mounting Shelf in which DC-DC Converters are required. Note that some Module Mounting Assemblies consist of multiple 8-position Module Mounting Shelves. The kit permits the middle four (4) positions in an 8-position Module Mounting Shelf to accept DC-DC Converter Modules or Rectifier Modules (PCUs). List 60 is factory installed within the 8-position Module Mounting Shelf. List 60 kits will be installed starting with bottom 8-position Module Mounting Shelf in the Module Mounting Assembly and working up.
8) Order Rectifier Modules (PCUs) per List 50 as required.
9) Order DC-DC Converter Modules per List 62 as required.
10) Order one (1) Module Mounting Position Blank Cover Panel, Part No. 540959, for each empty module mounting position in the system.
11) Order fuses and/or circuit breakers, as required, per 'Distribution Devices' under ACCESSORY DESCRIPTIONS.
12) Order input and load distribution lugs, as required, per 'Wiring Components' under ACCESSORY DESCRIPTIONS.

13) Order as required additional options per Lists 29, 71, and 93.

14) Order as required any additional accessories described under ACCESSORY DESCRIPTIONS.

List 2: Supplemental Bay Common Equipment (Power and Distribution) (located next to Main Bay)

Features

- Provides common equipment for one bussed “power and distribution” bay rated for up to 2000 amperes of distribution. Includes interbay power busbars and communications cabling.
- Mounts to either left or right side of a List 1 Main Bay.
- Accepts one (1) Distribution Cabinet (options are 3-Row or 4-Row cabinet).
- Accepts one (1) Module Mounting Assembly. The Module Mounting Assembly can consist of one (1), two (2), three (3), or four (4) factory interconnected 8-position Module Mounting Shelves. Each Module Mounting Shelf in a Module Mounting Assembly provides eight (8) mounting positions for Rectifier Modules (PCUs).
  or
  Can be configured for “distribution only” (no Module Mounting Assembly).

Restrictions

Order maximum of one (1) List 2 or List 5 per Power System.
Cannot be used when List 5 is ordered. Order List 2 or List 5, not both.

Supplemental Bays DO NOT accept Converter Modules. DO NOT order List 60 or 62 for Supplemental Bays.

List 2 Supplemental Bay DOES NOT accept List 21 or 22 Distribution Cabinet
(List 21 and 22 are not provided with connection points for interbay busbars.)

Rear access is required for installation of inter-bay busbars.

Ordering Notes

1) Order a relay rack per 'Relay Racks' under ACCESSORY DESCRIPTIONS. If required, order Relay Rack Transition Plates per 'Transition Plates to Mount Relay Rack P/N 543156 on Top of GNB Absolyte IIP Batteries' under ACCESSORY DESCRIPTIONS. Relay rack must be same height as relay rack ordered for List 1. A ship loose option is available, as described in 'Relay Racks' under ACCESSORY DESCRIPTIONS.
2) Order one (1) List 23 or 24 Distribution Cabinet.
3) Order up to four (4) Distribution Bus Panels as required per 'Distribution Bus Arrangements' and the capacity of the Distribution Cabinet ordered.
4) Order one (1) List 30 (interface components for one (1) Module Mounting Assembly). Order a Module Mounting Assembly per PD588705101/PD588705102/PD588705103/PD58805104. List 30 is factory connected to the Module Mounting Assembly ordered.
   or
   Order Supplemental Bay 'Distribution Only' option per List 4.
5) Order Rectifier Modules (PCUs) per List 50 as required.
6) Order one (1) Module Mounting Position Blank Cover Panel, Part No. 540959, for each empty module mounting position in the system.
7) Order fuses and/or circuit breakers, as required, per 'Distribution Devices' under ACCESSORY DESCRIPTIONS.
8) Order input and load distribution lugs, as required, per 'Wiring Components' under ACCESSORY DESCRIPTIONS.

9) Order as required additional options per Lists 29 and 93.

10) Order as required any additional accessories described under ACCESSORY DESCRIPTIONS.

List 4: "Distribution Only" Option for Lists 2 or 5

Features

- Provides components needed to convert one List 2 or List 5 bay from "power and distribution" to "distribution only".

Restrictions

A Module Mounting Assembly cannot be mounted in a bay when List 4 is installed.

Ordering Notes

1) Order one List 4 for each List 2 or List 5 being ordered for distribution only.

List 5: Supplemental Bay Common Equipment (Power and Distribution) (located away from Main Bay)

Features

- Provides common equipment for one remote "power and distribution" bay rated for up to 2000 amperes of distribution. Includes inter-bay communications cabling.
- Accepts one (1) Distribution Cabinet (options are 1-Row, 2-Row, 3-Row, or 4-Row cabinet).
- Accepts one (1) Module Mounting Assembly. The Module Mounting Assembly can consist of one (1), two (2), three (3), or four (4) factory interconnected 8-position Module Mounting Shelves. Each Module Mounting Shelf in a Module Mounting Assembly provides eight (8) mounting positions for Rectifier Modules (PCUs).
  or
  Can be configured for "distribution only" (no Module Mounting Assembly).

Restrictions

Order maximum of one (1) List 2 or List 5 per Power System.
Cannot be used when List 2 is ordered. Order List 2 or List 5, not both.

Supplemental Bays DO NOT accept Converter Modules. DO NOT order List 60 or 62 for Supplemental Bays.

Interbay power cabling is not included, and must be separately provided per site requirements.

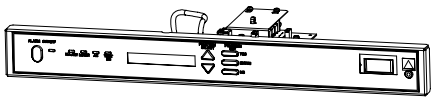
Ordering Notes

1) Order a relay rack per 'Relay Racks' under ACCESSORY DESCRIPTIONS. If required, order Relay Rack Transition Plates per 'Transition Plates to Mount Relay Rack P/N 543156 on Top of GNB Absolyte IIP Batteries' under ACCESSORY DESCRIPTIONS. A ship loose option is available, as described in 'Relay Racks' under ACCESSORY DESCRIPTIONS.
2) Order one (1) List 21, 22, 23, or 24 Distribution Cabinet.
3) Order up to four (4) Distribution Bus Panels as required per 'Distribution Bus Arrangements' and the capacity of the Distribution Cabinet ordered.
4) Order one (1) List 30 (interface components for one (1) Module Mounting Assembly). Order a Module Mounting Assembly per PD588705101/PD588705102/PD588705103/PD58805104. List 30 is factory connected to the Module Mounting Assembly ordered.
   or
   Order Supplemental Bay 'Distribution Only' option per List 4.
5) Order Rectifier Modules (PCUs) per List 50 as required.

6) Order one (1) Module Mounting Position Blank Cover Panel, Part No. 540959, for each empty module mounting position in the system.
7) Order fuses and/or circuit breakers, as required, per 'Distribution Devices' under ACCESSORY DESCRIPTIONS.
8) Order input and load distribution lugs, as required, per 'Wiring Components' under ACCESSORY DESCRIPTIONS.
9) Order as required additional options per Lists 29 and 93.
10) Order as required any additional accessories described under ACCESSORY DESCRIPTIONS.

List 10: MCA (Standard Application)

Features



- Provides one standard application Meter-Control-Alarm (MCA) assembly (Configuration No. 534876). Refer to SPECIFICATIONS for a description of MCA functions.
- Alarms: Major, Minor, High Voltage #1, High Voltage #2, Battery on Discharge, 50% Battery On Discharge, AC Fail, MCA Audible, Test/Equalize Mode.

Restrictions

Only one (1) MCA per power system is required.

Mounts in the Main Bay Distribution Cabinet.

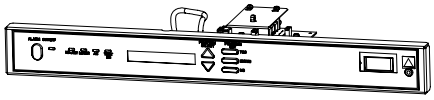
Cannot be ordered with List 2 or List 5.

Ordering Notes

1) Order one (1) List 10, 11, 12, or 13 as required per power system.

List 11: MCA (Special Application)

Features



- Provides one special application Meter-Control-Alarm (MCA) assembly (Configuration No. 534877). Refer to SPECIFICATIONS for a description of MCA functions.
- Alarms: Major, Minor, High Voltage #1, Rectifier Module Fail Major, Battery On Discharge, Rectifier Module Fail Minor, AC Fail, MCA Audible, Fuse/Circuit Breaker.

Restrictions

Only one (1) MCA per power system is required.

Mounts in the Main Bay Distribution Cabinet.

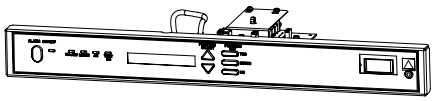
Cannot be ordered with List 2 or List 5.

Ordering Notes

1) Order one (1) List 10, 11, 12, or 13 as required per power system.

List 12: MCA (Special Application)

Features



- Provides one special application Meter-Control-Alarm (MCA) assembly (Configuration No. 534878). Refer to SPECIFICATIONS for a description of MCA functions.
- Alarms: Major, Minor, High Voltage #1, MCA Fail, Battery on Discharge, Very Low Voltage, AC Fail, Fuse/Circuit Breaker, Rectifier Module Fail.

Restrictions

Only one (1) MCA per power system is required.

Mounts in the Main Bay Distribution Cabinet.

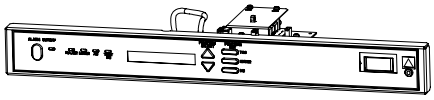
Cannot be ordered with List 2 or List 5.

Ordering Notes

1) Order one (1) List 10, 11, 12, or 13 as required per power system.

List 13: MCA (Special Application)

Features



- Provides one special application Meter-Control-Alarm (MCA) assembly (Configuration No. 534879). Refer to SPECIFICATIONS for a description of MCA functions.
- Alarms: Major, Minor, Test/Equalize 2, Fuse/Circuit Breaker, Battery on Discharge, 50% Battery On Discharge, AC Fail, Low Voltage Disconnect, Test/Equalize 1.

Restrictions

Only one (1) MCA per power system is required.

Mounts in the Main Bay Distribution Cabinet.

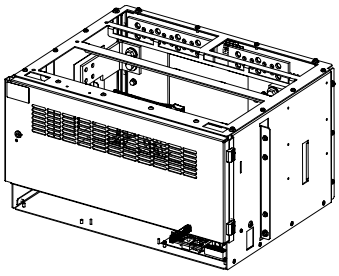
Cannot be ordered with List 2 or List 5.

Ordering Notes

1) Order one (1) List 10, 11, 12, or 13 as required per power system.

List 21: One-Row Distribution Cabinet

Features



- Accepts one (1) Distribution Bus Panel.
- Rated for up to 500 amperes of distribution (960 amperes when equipped with List ND).
- Available for use in List 1 and List 5 bays.
- One (1) Quad Shunt circuit card (P/N 507431) is provided with each distribution cabinet. This circuit card can monitor up to four (4) system distribution load shunts. All shunt cards interface with the MCA for system distribution load current monitoring.
- A Low Voltage Disconnect (LVD) circuit card (P/N 509477) is provided in each Distribution Cabinet that…
  - Contains one or more distribution rows that are equipped with a low voltage disconnect contactor, or

- Controls a Low Voltage Battery Disconnect (LVBD) contactor located in an associated Battery Stand.

The LVD circuit card provides three separate control circuits. Each control circuit can be programmed, through the MCA, with its own disconnect voltage setpoint and one global reconnect setpoint. One LVD circuit card can control up to four (4) contactors. Any contactor can be controlled by any of the three control circuits on the card by setting of user-selectable switches.

Where more than one Distribution Cabinet contains an LVD control circuit card, the control circuits on all LVD circuit cards can be set to any of the three MCA-controlled disconnect setpoints independently with user-selectable switches.

Each of the three control circuits on any LVD card consists of two individual battery voltage monitors, both of which must sense low system voltage before disconnection can occur. This redundancy prevents a control circuit failure from unnecessarily disconnecting loads or batteries.

The user can set the low voltage disconnect circuits for either automatic or manual reconnect.

- **Automatic Reconnect:** When system bus voltage recovers to a preset adjustable value, the low voltage disconnect circuits automatically reconnect the loads (or battery) to the system bus.
- **Manual Reconnect:** When system bus voltage has recovered to a preset adjustable value, the user must issue a command via the MCA to reconnect loads (or battery) to the system bus.

A local switch provided in each Distribution Cabinet can be set to inhibit LVD operation for adjustment, maintenance, and repair purposes. A local indicator illuminates when the low voltage disconnect circuit has been inhibited. LVD operation is not inhibited in any other Distribution Cabinets in the power system.

Restrictions

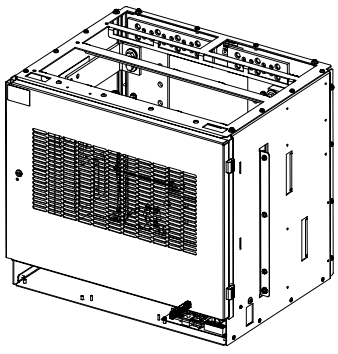
Not available for List 2 bays (no inter-bay busbar landings available).

Cannot be ordered with List 1 if it is to be used with a List 2.

Ordering Notes

1) Order one (1) Distribution Bus Panel for each List 21 per 'Distribution Bus Arrangements'.
2) Order fuses and/or circuit breakers, as required, per 'Distribution Devices' under ACCESSORY DESCRIPTIONS.
3) Order input and load distribution lugs, as required, per 'Wiring Components' under ACCESSORY DESCRIPTIONS.

List 22: Two-Row Distribution Cabinet



Features

- Accepts up to two (2) Distribution Bus Panels.
- Rated for up to 1000 amperes of distribution.
- Available for use in List 1 and List 5 bays.
- See also the description of the Quad Shunt circuit card under List 21 features.
- See also the description of the Low Voltage Disconnect circuit card under List 21 features.

Restrictions

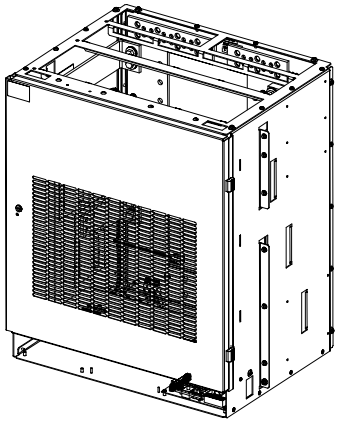
Not available for List 2 bays (no inter-bay busbar landings available).

Cannot be ordered with List 1 if it is to be used with a List 2.

Ordering Notes

1) Order up to two (2) Distribution Bus Panels for each List 22 per 'Distribution Bus Arrangements'.
2) Order fuses and/or circuit breakers, as required, per 'Distribution Devices' under ACCESSORY DESCRIPTIONS.
3) Order input and load distribution lugs, as required, per 'Wiring Components' under ACCESSORY DESCRIPTIONS.

List 23: Three-Row Distribution Cabinet



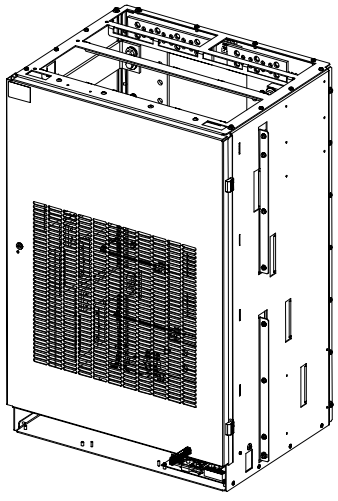
Features

- Accepts up to three (3) Distribution Bus Panels.
- Rated for up to 1500 amperes of distribution.
- Available for use in List 1, List 2, and List 5 bays.
- See also the description of the Quad Shunt circuit card under List 21 features.
- See also the description of the Low Voltage Disconnect circuit card under List 21 features.

Ordering Notes

1) Order up to three (3) Distribution Bus Panels for each List 23 per 'Distribution Bus Arrangements'.
2) Order fuses and/or circuit breakers, as required, per 'Distribution Devices' under ACCESSORY DESCRIPTIONS.
3) Order input and load distribution lugs, as required, per 'Wiring Components' under ACCESSORY DESCRIPTIONS.

List 24: Four-Row Distribution Cabinet



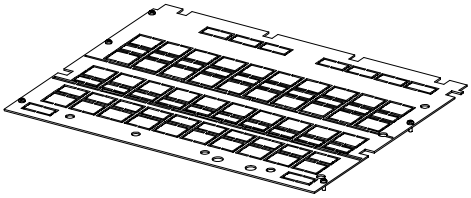
Features

- Accepts up to four (4) Distribution Bus Panels.
- Rated for up to 2000 amperes of distribution.
- Available for use in List 1, List 2, and List 5 bays.
- See also the description of the Quad Shunt circuit card under List 21 features.
- See also the description of the Low Voltage Disconnect circuit card under List 21 features.

Ordering Notes

1) Order up to four (4) Distribution Bus Panels for each List 24 per 'Distribution Bus Arrangements'.
2) Order fuses and/or circuit breakers, as required, per 'Distribution Devices' under ACCESSORY DESCRIPTIONS.
3) Order input and load distribution lugs, as required, per 'Wiring Components' under ACCESSORY DESCRIPTIONS.

List 29: Top Shield for Distribution Cabinet



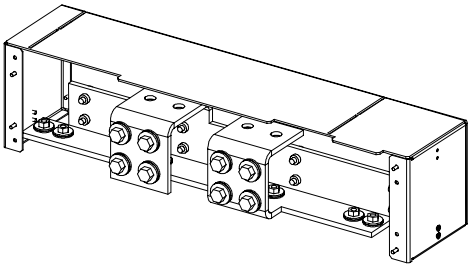
Features

- Plastic shield covers all wiring access openings in top of Distribution Cabinet. Individual cutouts can be removed for wiring as required for specific installation.

Ordering Notes

1) Where closed top cover is required, order one (1) List 29 for each List 21, 22, 23, and 24 ordered.

List 30: Module Mounting Assembly Interface Components



Features

- Provides components to add one (1) Module Mounting Assembly (Spec. No. 588705101, 588705102, 588705103, or 588705104) to a Main or Supplemental Bay.
- The separately ordered Module Mounting Assembly can consist of one (1), two (2), three (3), or four (4) factory interconnected 8-position Module Mounting Shelves. Each Module Mounting Shelf in a Module Mounting Assembly provides eight (8) mounting positions for Rectifier Modules (PCUs). When the Module Mounting Shelf is equipped with a DC-DC Converter Option Kit, the four (4) middle positions will accept either Rectifier Modules (PCUs) or +24V/-48V DC-DC Converter Modules. Note that Supplemental Bays CANNOT have Converter Modules.
- Refer to Power Data Sheet PD588705100/PD588705101/PD588705102/PD588705103/PD588705104 for Module Mounting Assembly information.

Restrictions

Factory installed only on the Distribution Cabinet.

Includes 'Module Mounting Assembly-to-Power System/Distribution Cabinet' interconnect components only. The Module Mounting Assembly must be ordered separately.

Each bay can be equipped with a maximum of one (1) Module Mounting Assembly.

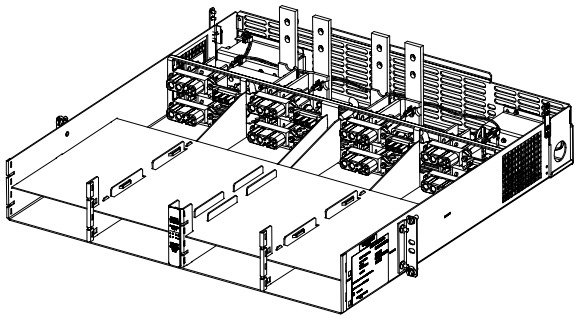
Ordering Notes

1) Order one (1) List 30 per bay, regardless of the number of module mounting positions required (32 positions maximum per bay).
2) Order a Module Mounting Assembly per Power Data Sheet PD588705101/PD588705102/PD588705103/PD588705104 as required.
3) Order one (1) List 60 (DC-DC Converter Option Kit) for each 8-position Module Mounting Shelf in which DC-DC Converters are required. Note that some Module Mounting Assemblies consist of multiple 8-position Module Mounting Shelves. The kit permits the middle four (4) positions in an 8-position Module Mounting Shelf to accept DC-DC Converter Modules or Rectifier Modules (PCUs). List 60 is factory installed within the 8-position Module Mounting Shelf. List 60 kits will be installed starting with bottom 8-position Module Mounting Shelf in the Module Mounting Assembly and working up. Note that Supplemental Bays CANNOT have Converter Modules.
4) Order Rectifier Modules (PCUs) per List 50 as required.
5) Order DC-DC Converter Modules per List 62 as required.
Note that Supplemental Bays CANNOT have Converter Modules.

6) Order a Module Mounting Position Blank Cover Panel, Part No. 540959, for each empty module mounting position in the system.

List 31: Field Expansion Kit: One (1) 8-Position Module Mounting Assembly

Features



- Provides one (1) Spec No. 588705100 Module Mounting Assembly and components required for field installation in an existing Power System that has eight (8) to twenty-four (24) positions.
- Included are busbars for connecting rectifier output to the main system bus, and cables for connecting DC-DC Converter output to the appropriate dual voltage bus distribution panel assembly (if using converters).
- The Module Mounting Shelf provides eight (8) mounting positions for Rectifier Modules (PCUs). When the shelf is equipped with a DC-DC Converter Option Kit, the four (4) middle positions will accept either Rectifier Modules (PCUs) or +24V/-48V DC-DC Converter Modules. Note that Supplemental Bays CANNOT have Converter Modules.
- Refer to Power Data Sheet PD588705100 for more information.

Restrictions

For field installation only.

Maximum number of List 31 that can be installed in a power bay is one (1).

Original system must have a Module Mounting Assembly (up to twenty-four [24] positions).

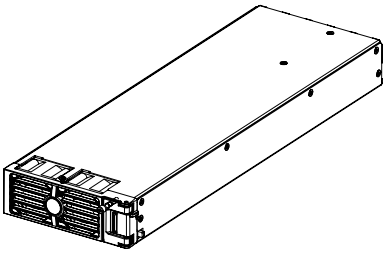
Cannot be used in a power bay equipped with a Spec No. 588705104 Module Mounting Assembly.

Converter Modules must be used in conjunction with a dual voltage bus distribution panel assembly (List JA, JB, JC, JD, KA, LB, or LC). Note that Supplemental Bays CANNOT have Converter Modules.

Ordering Notes

1) For a bay equipped with Spec. No. 588705101 List 1, Spec. No. 588705102 List 1, or Spec. No. 588705103 List 1, order one (1) List 31.
2) Order one (1) List 60 (DC-DC Converter Option Kit) for each List 31 requiring DC-DC Converters. The kit permits the middle four (4) positions in the 8-position Module Mounting Shelf to accept DC-DC Converter Modules or Rectifier Modules (PCUs). List 60 is factory installed within the 8-position Module Mounting Shelf in the assembly. Note that Supplemental Bays CANNOT have Converter Modules.
3) Order Rectifier Modules (PCUs) per List 50 as required.
4) Order DC-DC Converter Modules per List 62 as required.
   Note that Supplemental Bays CANNOT have Converter Modules.
5) Order a Module Mounting Position Blank Cover Panel, Part No. 540959, for each empty module mounting position in the assembly.

List 50: Rectifier Module (PCU)



Features

- Provides one (1) Model R24-2500, Spec. No. 1R242500, Rectifier Module (PCU).
- Refer to Power Data Sheet PD588705100/PD588705101/PD588705102/PD588705103/ PD588705104 for more information.

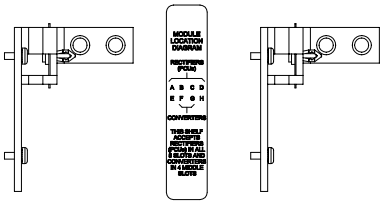
Restrictions

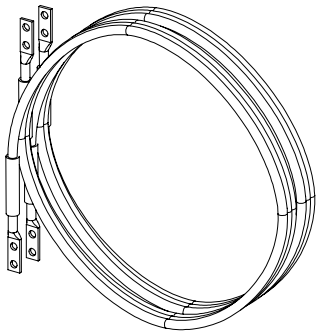
For use in Spec. No. 588705100, 588705101, 588705102, 588705103, or 588705104 Module Mounting Assemblies.

Ordering Notes

1) Order as required.

List 60: DC-DC Converter Option Interface Component Kit





Features

- Provides components to add DC-DC Converter capability to one (1) 8-position Module Mounting Shelf in a Module Mounting Assembly. With one (1) List 60 installed, the four middle mounting positions in an 8-position Module Mounting Shelf in the Module Mounting Assembly will accept DC-DC Converters or Rectifier Modules (PCUs).
- Includes cables for connection of converter output to a dual voltage bus distribution panel assembly.

Restrictions

MUST be factory installed only.

CANNOT be used in Supplemental Bays.

Must be used in conjunction with a dual voltage bus distribution panel assembly (List JA, JB, JC, JD, KA, LB, or LC). Up to two (2) converter kits can be used with a List JA, JB, JC, JD, LB, or LC. Up to four (4) converter kits can be used with a List KA.

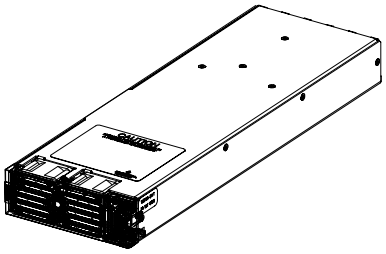
Total rectifier output power available for customer loads is reduced by the input power of each DC-DC Converter Module installed.

Ordering Notes

1) Order one (1) List 60 (DC-DC Converter Option Kit) for each 8-position Module Mounting Shelf in which DC-DC Converters are required (see **restrictions** above). Note that some Module Mounting Assemblies consist of multiple 8-position mounting shelves. The kit permits the middle four (4) positions in an 8-position Module Mounting Shelf to accept DC-DC Converter Modules or Rectifier Modules (PCUs). List 60 is factory installed within the 8-position Module Mounting Shelf. Multiple List 60 kits will be installed starting with bottom 8-position Module Mounting Shelf in the Module Mounting Assembly and working up. Note that Supplemental Bays CANNOT have Converter Modules.
2) Order up to four (4) converter modules (List 62) for each List 60 ordered.

List 62: DC-DC Converter Module

Features



- Provides one (1) Model C24/48-1500, Spec. No. 1C24481500, DC-DC Converter Module.
- Refer to Power Data Sheet PD588705100/PD588705101/PD588705102/PD588705103/ PD588705104 for more information.

Restrictions

For use in Spec. No. 588705100, 588705101, 588705102, 588705103, or 588705104 Module Mounting Assemblies.

Requires List 60.

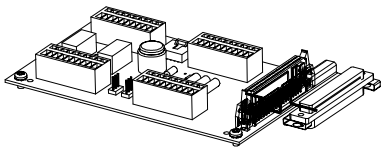
Supplemental Bays CANNOT have Converter Modules.

Ordering Notes

1) Order as required. Each 8-position Module Mounting Shelf holds up to four (4) DC-DC Converter Modules when equipped with a DC-DC Converter Option Kit.

List 71: Optional Audible Alarm and Alarm Termination Circuit Card

Features



- Provides an Audible Alarm and Alarm Termination circuit card (P/N 509539). This circuit card is interconnected to the MCA and (via relays on the circuit card) to external converter major and minor alarm circuits (if converters are furnished). The circuit card provides spring-clamp type terminals for connection of customer wiring to the MCA external alarm circuits in lieu of the standard alarm cable.
- Includes a local audible alarm-sounding device connected to the external audible alarm contacts. The audible alarm can be silenced locally.

Restrictions

Must be located in Main Bay (List 1) only.

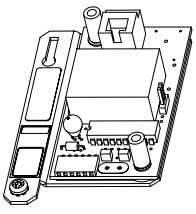
Audible alarm is inoperative when used with List 12 or 13 MCA (no audible alarm relay contacts available).

Ordering Notes

1) Order per site requirements.

List 72: MCA Interface Modem Option

Features



- Provides a 2400 bits/s Modem circuit card, Spec. No. 486781300, plus associated hardware.
- This option plugs into the MCA.
- Allows MCA interface via a modem port.
- See also WinLink Software (List 73).

Restrictions

Must be located in Main Bay (List 1) only.

Only one interface option (List 72, 74, 75, 76, 77, or 78) can be installed.

Ordering Notes

1) Order this option for each Power System (MCA) to be accessed via WinLink Software (List 73) via modem.

List 73: MCA Interface WinLink Software

Features

- Provides Spec. No. 041182000 (WinLink Software).
- WinLink Software provides the user the ability to remotely communicate with multiple Power Systems equipped with an MCA. Only one Power System (MCA) can be remotely connected at a time. This allows a user to remotely monitor, control, and adjust the Power System via WinLink. Remote communications can be done over dial-up phone lines when the Power System is equipped with the List 72 Modem or List 74 RS-232/Modem MCA Interface Option. Remote communications can be done via an RS-232 connection when the Power System is equipped with the List 74 RS-232/Modem MCA Interface Option. Remote communications can be done via a TCP/IP connection when the Power System is equipped with the Ethernet MCA Interface Option (List 75, 76, 77, or 78).
- With WinLink Software, most tasks accomplished via the Power System MCA local interface pad can be done remotely. This includes alarm monitoring, voltage/current monitoring, and adjustment of alarm and control circuits.
- Runs under Windows 98, ME, NT 4.0, 2000, or XP.
- See also Modem (List 72), RS-232/Modem (List 74), or Ethernet (List 75, 76, 77, or 78) MCA Interface Options.

Restrictions

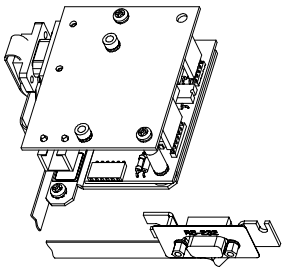
Not required for Lists 75, 76, 77, or 78.

Ordering Notes

1) Only one List 73 required for each computer installation.

List 74: MCA Interface Combination Modem/RS-232 Option

Features



- Provides a Modem circuit card, an RS-232 circuit card, and associated mounting hardware.
- This option plugs into the MCA.
- Allows MCA interface via an RS-232 and Modem port.
- See also WinLink Software (List 73).

Restrictions

Must be located in Main Bay (List 1) only.

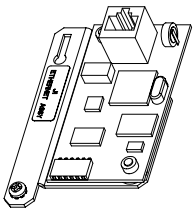
Only one interface option (List 72, 74, 75, 76, 77, or 78) can be installed.

Ordering Notes

1) Order this option for each Power System (MCA) to be accessed via WinLink Software (List 73) via modem or RS-232.

List 75: MCA Interface Ethernet Option: WinLink Compatible + Web Interface

Features



- Provides an Ethernet circuit card (P/N 524541) and associated mounting hardware.
- Ethernet circuit card is **WinLink Compatible** and provides a **Web Interface**.
- This option plugs into the MCA.
- Allows MCA interface via an Ethernet port.
- See also WinLink Software (List 73).

Restrictions

Must be located in Main Bay (List 1) only.

Only one interface option (List 72, 74, 75, 76, 77, or 78) can be installed.

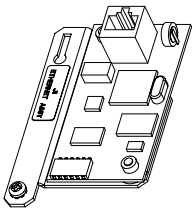
The Ethernet card requires an MCA with firmware version 5.2.0 or later.

Ordering Notes

1) Order this option for each Power System (MCA) to be accessed via WEB Interface.
2) Order optional Front Access Ethernet Connector Kit P/N 525110, as required. This includes an RJ45 connector, mounting bracket, and jumper that mounts in the cutout provided on the front of the MCA Panel.
3) WinLink Software (List 73) will operate with List 75 but is not required. Internal WEB Pages are preferred.

List 76: MCA Interface Ethernet Option: WinLink Compatible + Web Interface + SNMP

Features



- Provides an Ethernet circuit card (P/N 524541) and associated mounting hardware.
- Ethernet circuit card is **WinLink Compatible**, provides a **Web Interface**, and provides **SNMP**.
- This option plugs into the MCA.
- Allows MCA interface via an Ethernet port.
- See also WinLink Software (List 73).

Restrictions

Must be located in Main Bay (List 1) only.

Only one interface option (List 72, 74, 75, 76, 77, or 78) can be installed.

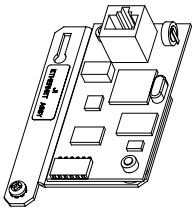
The Ethernet card requires an MCA with firmware version 5.2.0 or later.

Ordering Notes

1) Order this option for each Power System (MCA) to be accessed via WEB Interface.
2) Order optional Front Access Ethernet Connector Kit P/N 525110, as required. This includes an RJ45 connector, mounting bracket, and jumper that mounts in the cutout provided on the front of the MCA Panel.
3) WinLink Software (List 73) will operate with List 76 but is not required. Internal WEB Pages are preferred.

List 77: MCA Interface Ethernet Option: WinLink Compatible + Web Interface + Battery Monitoring

Features



- Provides an Ethernet circuit card (P/N 524541) and associated mounting hardware.
- Ethernet circuit card is **WinLink Compatible**, provides a **Web Interface**, and provides **Battery Monitoring**.
- This option plugs into the MCA.
- Allows MCA interface via an Ethernet port.
- See also WinLink Software (List 73).

Restrictions

Must be located in Main Bay (List 1) only.

Only one interface option (List 72, 74, 75, 76, 77, or 78) can be installed.

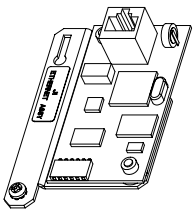
The Ethernet card requires an MCA with firmware version 5.2.0 or later.

Ordering Notes

1) Order this option for each Power System (MCA) to be accessed via WEB Interface.
2) Order optional Front Access Ethernet Connector Kit P/N 525110, as required. This includes an RJ45 connector, mounting bracket, and jumper that mounts in the cutout provided on the front of the MCA Panel.
3) WinLink Software (List 73) will operate with List 77 but is not required. Internal WEB Pages are preferred.

List 78: MCA Interface Ethernet Option: WinLink Compatible + Web Interface + SNMP + Battery Monitoring

Features



- Provides an Ethernet circuit card (P/N 524541) and associated mounting hardware.
- Ethernet circuit card is **WinLink Compatible**, provides a **Web Interface**, provides **Battery Monitoring**, and provides **SNMP**.
- This option plugs into the MCA.
- Allows MCA interface via an Ethernet port.
- See also WinLink Software (List 73).

Restrictions

Must be located in Main Bay (List 1) only.

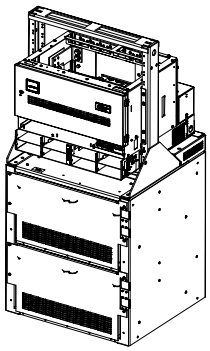
Only one interface option (List 72, 74, 75, 76, 77, or 78) can be installed.

The Ethernet card requires an MCA with firmware version 5.2.0 or later.

Ordering Notes

1) Order this option for each Power System (MCA) to be accessed via WEB Interface.
2) Order optional Front Access Ethernet Connector Kit P/N 525110, as required. This includes an RJ45 connector, mounting bracket, and jumper that mounts in the cutout provided on the front of the MCA Panel.
3) WinLink Software (List 73) will operate with List 78 but is not required. Internal WEB Pages are preferred.

List 92: Battery Stand System



Generic assembly of parts creating a List 92. Battery stand (number of rows), relay rack (height), shelf (number of positions), and distribution cabinet (number of rows) can vary depending on configuration.

Features

- Complete battery stand platform, including monitoring options. For more information, refer to SAG588810000.

Restrictions

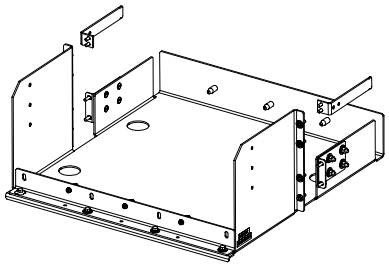
There must be 1RU of space below the power system.

List 92 cannot be ordered with Lists 4, 93, RA, RB, RC, RD, or RE.

Ordering Notes

1) Order as required. When List 92 is ordered as part of the power system, the power system can be mounted in a relay rack on top of the battery stand.
2) The system must be ordered in one of the following relay racks: 543151, 543152, 543153, 543154, 543155, 543156, 543157.
3) The system must be equipped with a rectifier shelf.

List 93: Battery Tray, Pre-Cabled



Features

- Provides one battery tray that mounts four (4) 12V front terminal VLRA batteries. Batteries are configured as two (2) 24V strings per tray. Battery cabling is factory-connected to Power System main bus.
- Accepts various Valve Regulated Lead Acid (VLRA) batteries. See **Ordering Notes** below.
- Tray dimensions are 21.3" wide X 22.4" deep. See 'List 93 (Battery Tray)' under *PHYSICAL SIZE INFORMATION* for a typical battery tray arrangement.
- Trays can be ordered with or without Battery Disconnect circuit breakers. When circuit breakers are ordered, one is provided in the +24V lead of each battery string (2 circuit breakers per tray).
- Inter-battery spacer plates included.

Restrictions

Cannot be used with List RA, RB, RC, RD, RE, or 92.

Maximum number of List 93 per bay is four (4).

A single List 93 must mount at bottom of bay. Multiples of List 93 must mount starting at bottom of bay and working upward.

Not a stand-alone battery system. Must be used as part of a power system that includes List 1, List 2 or List 5 with List 21, 22, 23, or 24 and List 30.

Ordering Notes

1) Order multiples of List 93 for more than one (1) battery tray. See **Restrictions**.
2) Order batteries separately. The following table lists batteries recommended for use with List 93.

Manufacturer*	Model	Emerson Network Power P/N	Rated 8-Hr. Capacity (Ah)	Dimension W x L x H (Inches)	Required Tray Spacing	Weight per battery (lbs)
C&D	TEL12-160F	140456	157	4.95 x 22.01 x 11.14	7U	115
C&D	TEL12-180F	--	181	4.95 x 22.01 x 12.60	8U	131
Deka Unigy I	12AVR-150ET	122018	150	4.90 x 22.00 x 11.75	8U	115
Douglas	DGS12-150F	125453	150	4.90 x 22.00 x 12.70	8U	137
Douglas	DST12-170F	--	170.8	4.92 x 22.05 x 12.60	8U	129.6
Enersys PowerSafe	12V155F	122010	155	4.92 x 22.09 x 12.44	8U	148
Fiamm	12FAT125	--	125	4.96 x 21.97 x 10.67	7U	110.23
Fiamm	12FAT155	--	155	4.96 x 21.97 x12.64	8U	132.25
GNB Marathon	M12V125FT	--	125	4.90 x 22.00 x 11.15	7U	105
GNB Marathon	M12V155FT	112795	155	4.90 x 22.00 x 11.15	7U	119
Northstar	NSB170FT	--	167	4.92 x 22.05 x 12.60	8U	131

* *See Battery Manufacturer Information located at the end of this document.*

3) Specify rack spacing of 7U (12.25") or 8U (14") between trays and above top tray as required for battery clearance. See table above.

4) Specify the batteries you intend to use with each List 93 ordered. Lugs for battery connections vary according to the batteries to be installed. Battery cables will be lugged as shown in the following table. The table is provided for reference only.

Battery Lug Kit Part Numbers (Kit provides two lugs for one tray.)			
Battery Specified	**Ordered Without Circuit Breaker**	**Ordered With Circuit Breaker 125A or Higher**	**Ordered With Circuit Breaker 100A or Lower**
C&D TEL12-160F	528235	528235	528234
C&D TEL12-180F	528235	528235	528234
Deka Unigy I 12AVR-150ET	528235	528235	528234
Douglas DGS12-150F	528237	528237	528236
Douglas DST12-170F	528235	528235	528234
Enersys PowerSafe 12V155F	528235	528235	528234
Fiamm 12FAT125	528235	528235	528234
Fiamm 12FAT155	528235	528235	528234
GNB Marathon M12V125FT	528235	528235	528234
GNB Marathon M12V155FT	528235	528235	528234
Northstar NSB170FT	528235	528235	528234

5) Specify with or without Battery Disconnect circuit breakers. ***Note:*** *All List 93 trays in a bay will be furnished with or without Battery Disconnect circuit breakers as specified for the first tray ordered.*

6) An assembly for connection of all List 93 is automatically added to the order. Part number depends on system configuration.

7) If ordering List 93 with circuit breakers, order two (2) circuit breakers per List 93 from the following table.

Ampere Rating	Part Number	
	Electrical/Mechanical Trip[1] (Black Handle)	Electrical Trip[2] (White Handle)
50	256694300	256694400
60	256694700	256694800
70	256695100	256695200
75	256695500	256695600
100	256695900	256696000
125	100765	100762
150	100763	100764
200	121810	121809

Circuit Breaker Alarm Operation:

[1] Provides an alarm during an electrical or manual trip condition.

[2] Provides an alarm during an electrical trip condition only.

List AA: Distribution Bus Module (P/N 509840) (24) Fuse/Circuit Breaker System Positions

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (24) Load Distribution Fuse / Circuit Breaker Mounting Positions (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers), or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".

Restrictions

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3-, or 4-bus row cabinet.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

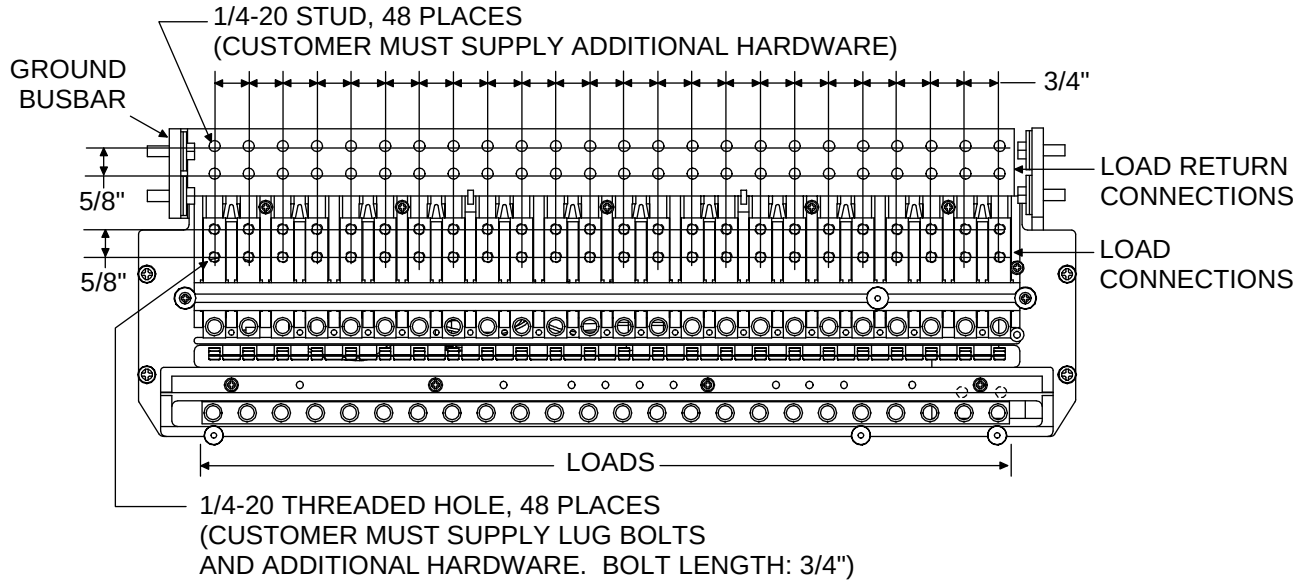
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332, as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List AB: Distribution Bus Module (P/N 428316100) (3) GJ/218 Circuit Breaker System Positions

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (3) Load Distribution Circuit Breaker Mounting Positions (100 to 600A GJ/218-Type) **NOTE RESTRICTIONS**

Restrictions

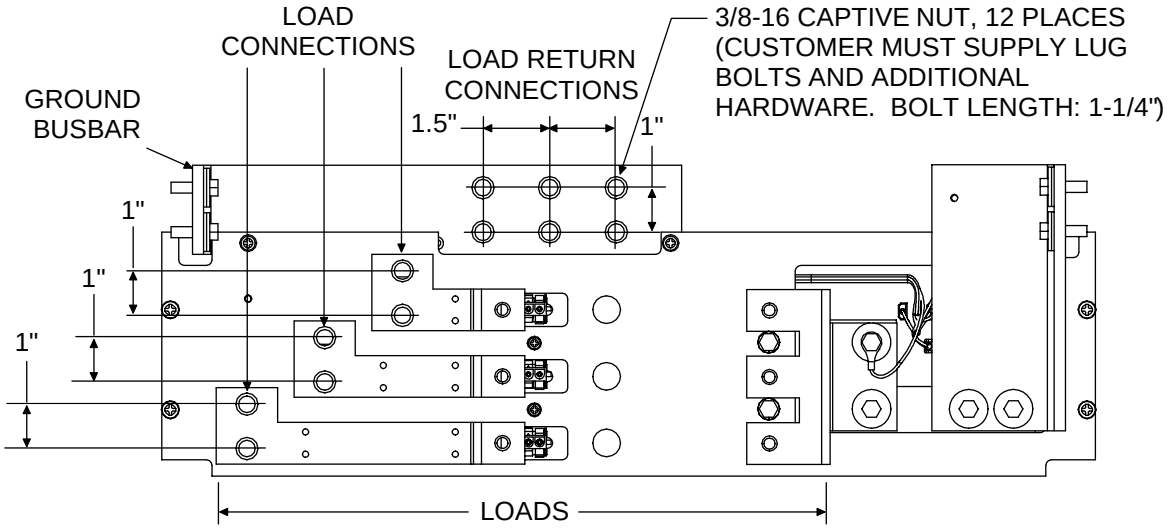
Can be installed in bus positions A-C (row 1-3) of a 1-, 2-, 3-, or 4-bus row cabinet. Cannot be installed in bus position D (row 4) of a 4-bus row cabinet. See also List AC for similar application in bus position D (row 4).

Panel is designed to mount circuit breakers in the following possible combinations:

(3) 100A to 250A
(1) 100A to 250A and (1) 300A or 400A
(1) 600A

Ordering Notes

1) Order circuit breakers and associated jumper kits as required per Tables 5 and 6.
2) Order load lugs (two hole, 3/8" bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List AC: Distribution Bus Module (P/N 507198) (3) GJ/218 Circuit Breaker System Positions

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (3) Load Distribution Circuit Breaker Mounting Positions (100 to 600A GJ/218-Type) **NOTE RESTRICTIONS**

Restrictions

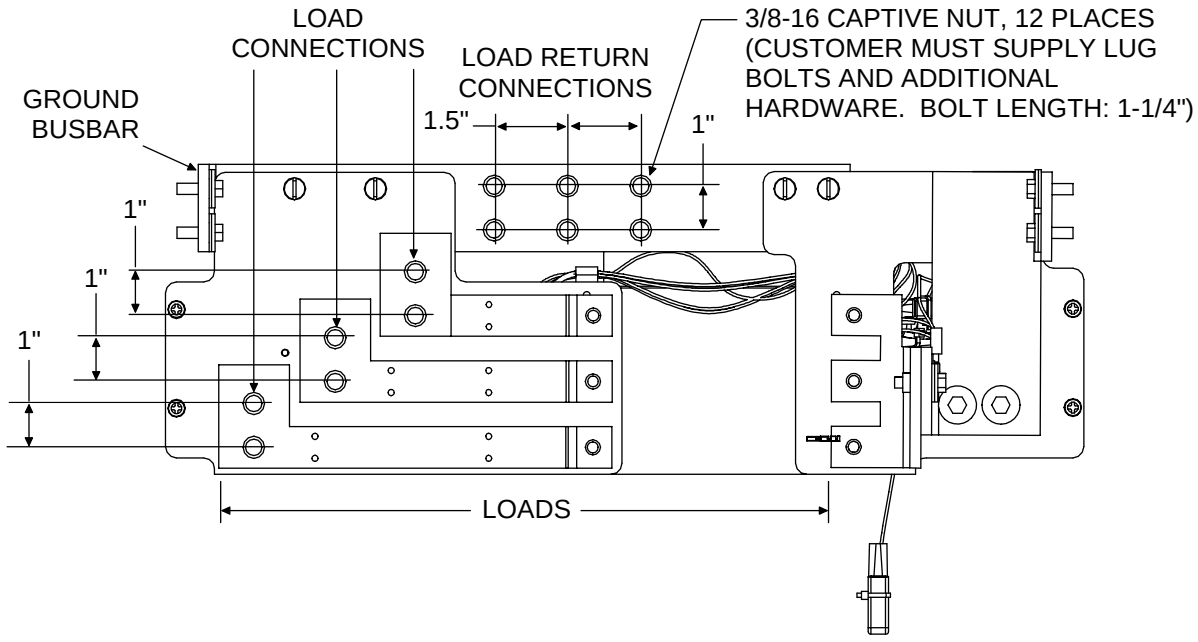
For use in a 4-bus row cabinet only. Must be installed in bus position D (row 4). See also List AB for similar application in bus positions A-C (rows 1-3).

Panel is designed to mount circuit breakers in the following possible combinations:

(3) 100A to 250A
(1) 100A to 250A and (1) 300A or 400A
(1) 600A

Ordering Notes

1) Order circuit breakers and associated jumper kits as required per Tables 5 and 6.
2) Order load lugs (two hole, 3/8" bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List AD: Distribution Bus Module (P/N 509565)
(8) GJ/218 Circuit Breaker System Positions (Upper Two Rows)

Features

- Single Voltage Distribution (+24V)
- 1,000A Maximum Capacity (500A per side)
- (8) Load Distribution Circuit Breaker Mounting Positions (100 to 600A GJ/218-Type) **NOTE RESTRICTIONS**

Restrictions

Occupies two distribution rows.

For use in a 4-bus row cabinet only. Must be installed in bus positions C and D (rows 3 and 4). See also List AE for similar application in bus positions A and B (rows 1 and 3) or B and C (rows 2 and 3).

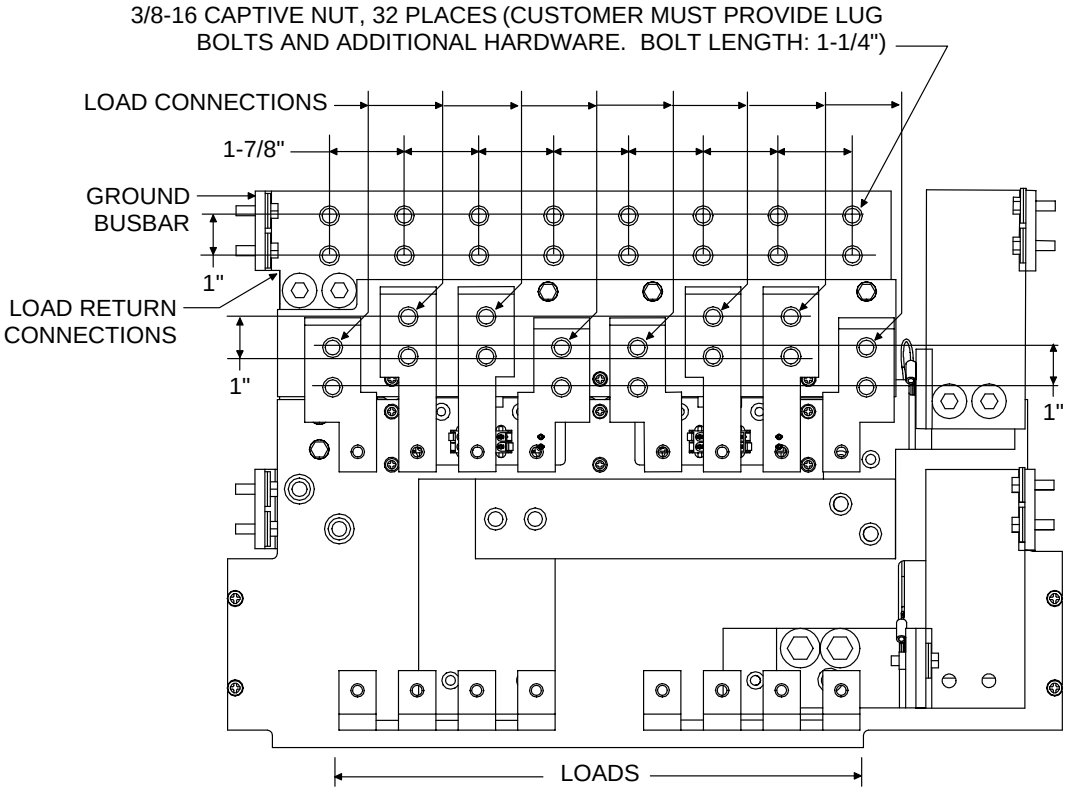
Panel is designed to mount circuit breakers in the following possible combinations **per side**:

(4) 100A to 250A
(2) 100A to 250A and (1) 300A or 400A
(2) 300A or 400A
(1) 600A and (1) 100A to 250A

Unless otherwise specified circuit breakers are divided between the two sides, and are mounted from left to right, starting with the highest capacity and working to the lowest capacity on each side.

Ordering Notes

1) Order circuit breakers and associated jumper kits as required per Tables 5 and 6.
2) Order load lugs (two hole, 3/8" bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List AE: Distribution Bus Module (P/N 509648)
(8) GJ/218 Circuit Breaker System Positions (Lower Two Rows)

Features

- Single Voltage Distribution (+24V)
- 1,000A Maximum Capacity (500A per side)
- (8) Load Distribution Circuit Breaker Mounting Positions (100 to 600A GJ/218-Type) **NOTE RESTRICTIONS**

Restrictions

Occupies two distribution rows.

For use in a 2-, 3-, or 4-bus row cabinet. Must be installed in bus positions A and B (rows 1 and 2), or B and C (rows 2 and 3). See also List AD for similar application in bus positions C and D (rows 3 and 4).

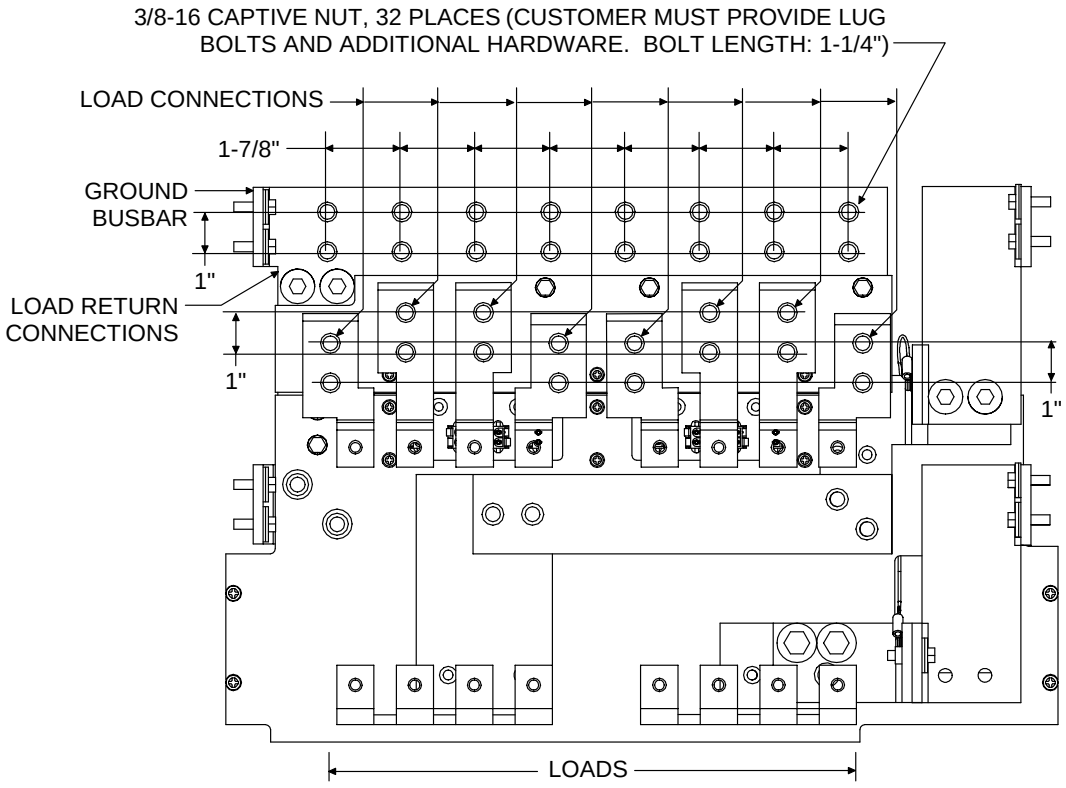
Panel is designed to mount circuit breakers in the following possible combinations **per side**:

(4) 100A to 250A
(2) 100A to 250A and (1) 300A or 400A
(2) 300A or 400A
(1) 600A and (1) 100A to 250A

Unless otherwise specified circuit breakers are divided between the two sides, and are mounted from left to right, starting with the highest capacity and working to the lowest capacity on each side.

Ordering Notes

1) Order circuit breakers and associated jumper kits as required per Tables 5 and 6.
2) Order load lugs (two hole, 3/8" bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List AG: Distribution Bus Module (P/N 514010) (2) TPH Fuse System Positions

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (2) Distribution Fuse Mounting Positions (70 to 600A TPH-Type)

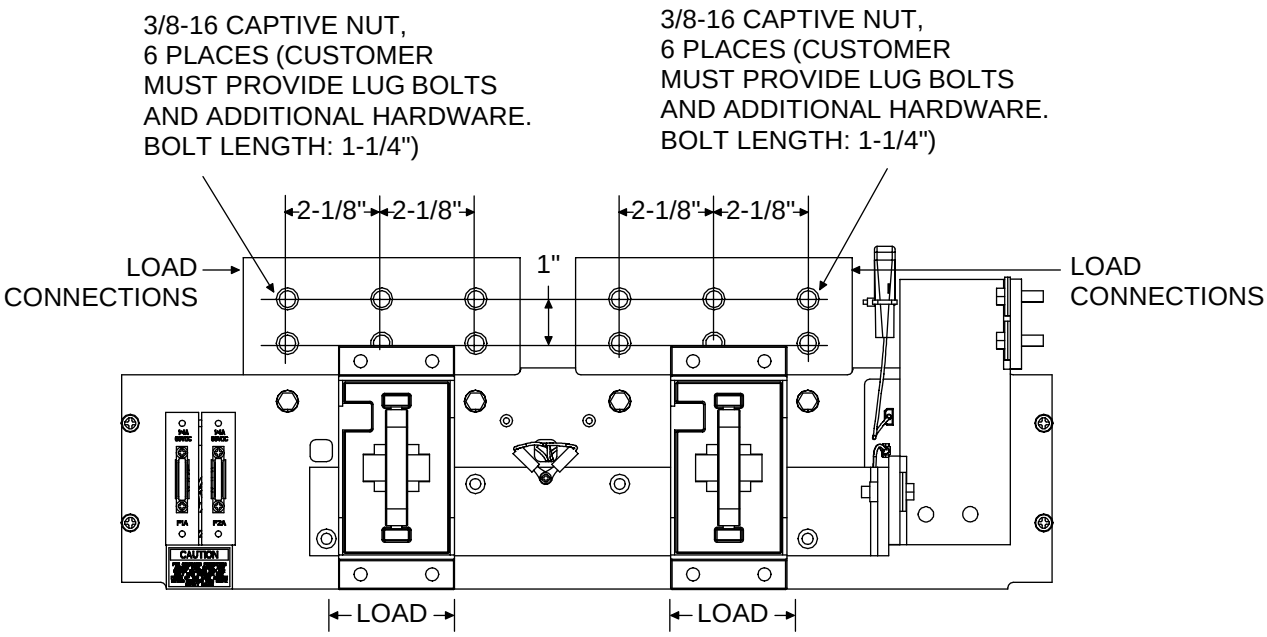
Restrictions

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3-, or 4-bus row cabinet.

Does not provide connection for load returns (see **Ordering Notes**).

Ordering Notes

1) To terminate load returns within the distribution cabinet, order one (1) List AH for up to two (2) List AG.
2) Order fuses as required per Table 4. Order replacement alarm fuses (1/4A) per Table 3.
3) Order load lugs (two hole, 3/8 bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List AH: Distribution Bus Module Ground Bar Assembly (P/N 500676) for Use with Up to (2) List AG, AJ, CG, or CJ

Features

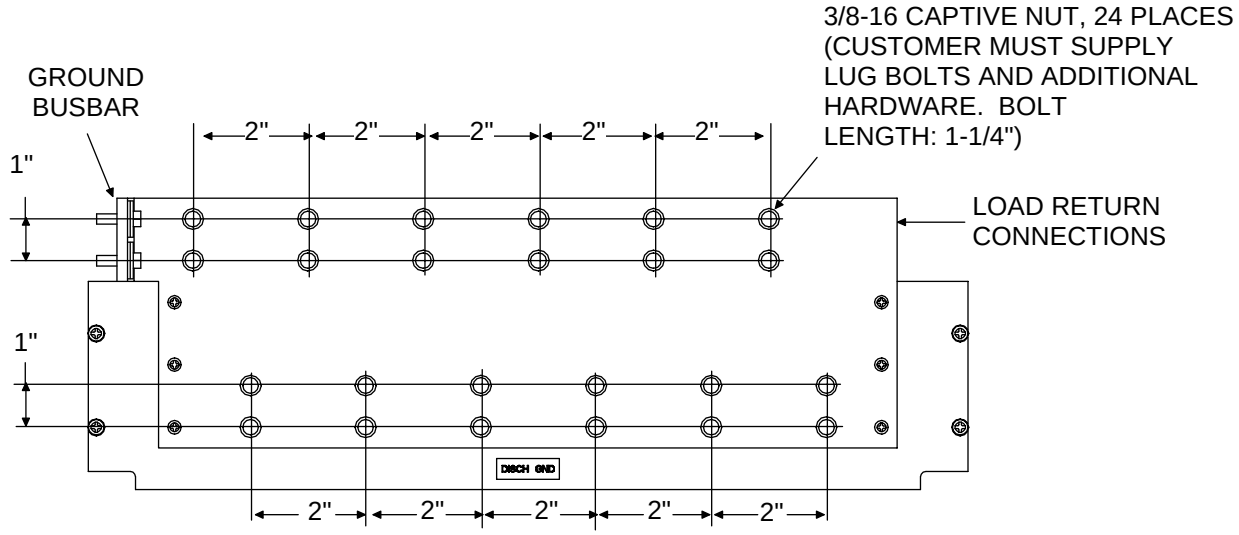
- Single Voltage Distribution (+24V)
- 1000A Maximum Capacity
- Groundbar Assembly for Use with Up to Two (2) List AG, AJ, CG, or CJ if internal load returns are required

Restrictions

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3-, or 4-bus row cabinet.

Ordering Notes

1) To terminate load returns within the distribution cabinet, order one (1) List AH for up to two (2) List AG, List AJ, List CG, or List CJ.



List AJ: Distribution Bus Module (P/N 520819)
(2) TPH Fuse System Positions with Load Metering Shunts

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (2) Distribution Fuse Mounting Positions
  (70 to 600A TPH-Type)
- (1) Load Shunt (800A, 50mV) per load fuse is provided. Extended shunt leads are 22 AWG stranded wire, approximately 7-10 ft. long from exit point at bottom of Distribution Cabinet. Each shunt lead is equipped with a 49.9 ohm current limiting resistor.

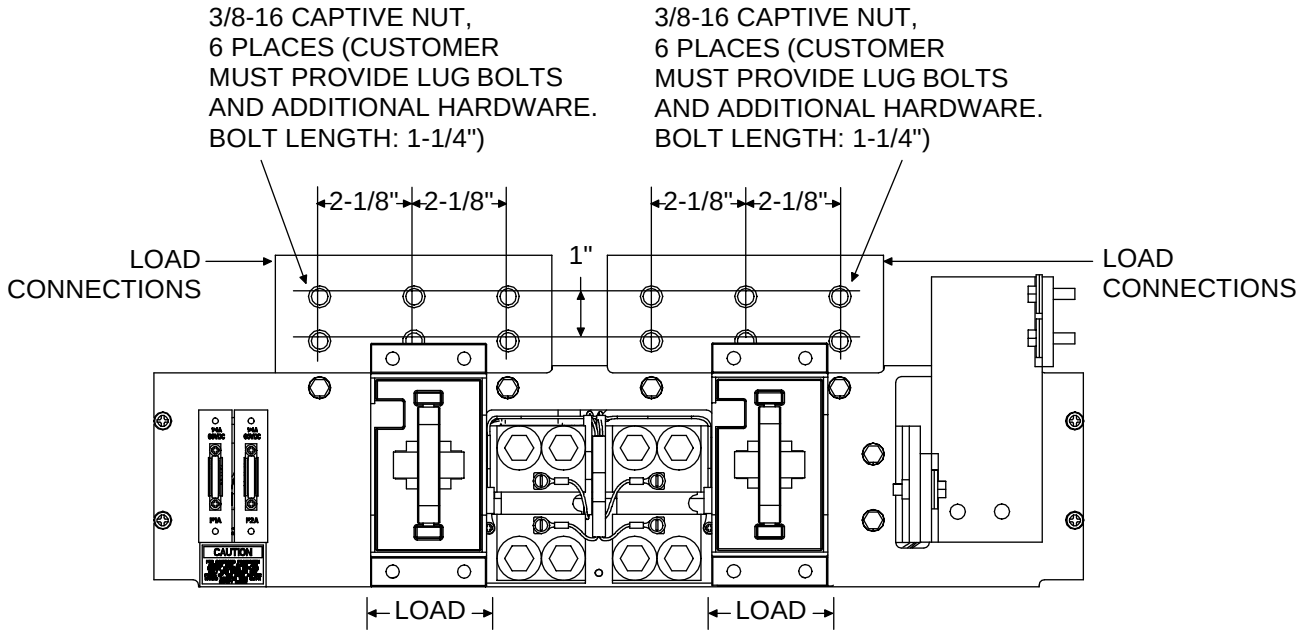
Restrictions

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3-, or 4-bus row cabinet.

Does not provide connection for load returns (see **Ordering Notes**).

Ordering Notes

1) To terminate load returns within the distribution cabinet, order one (1) List AH for up to two (2) List AJ.
2) Order fuses as required per Table 4. Order replacement alarm fuses (1/4A) per Table 3.
3) Order load lugs (two hole, 3/8 bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List AK: Distribution Bus Module (P/N 520805) (24) Fuse/Circuit Breaker System Positions

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (24) Load Distribution Fuse / Circuit Breaker Mounting Positions (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers), or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".

Restrictions

Provides no ground return busbar. Ground return connections must be made outside of Power Distribution Cabinet, or to List AL.

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3-, or 4-bus row cabinet. ***Note:*** *Additional restrictions apply if used in conjunction with a List AL. See List AL for restrictions.*

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

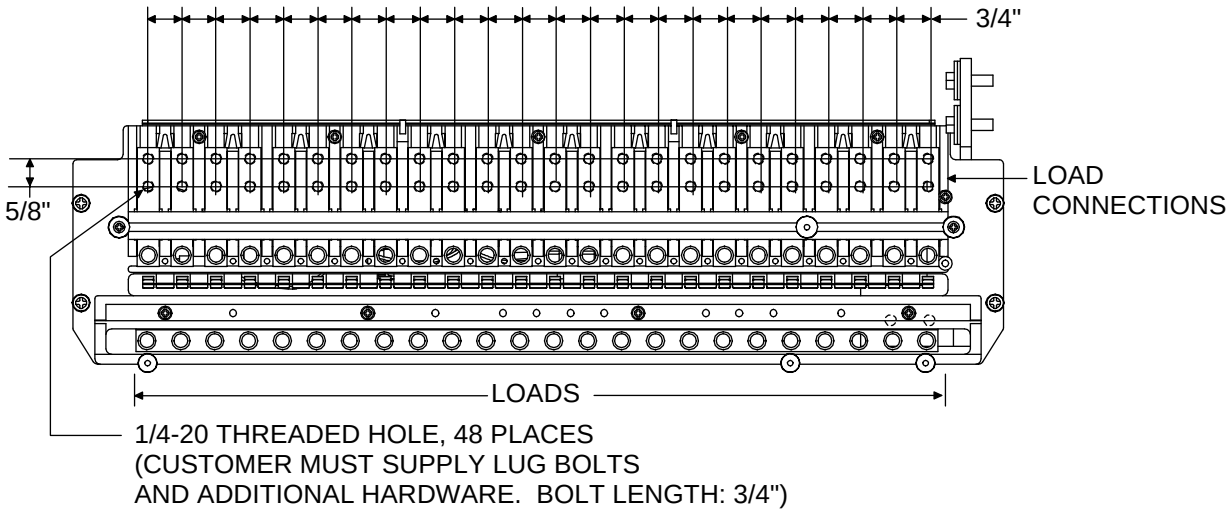
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332, as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List AL: Distribution Bus Module Ground Bar Assembly for Use with Up to (2) List AK

Features

- Groundbar Assembly for Use with Up to Two (2) List AK when Internal Load Returns are Required
- 1000A Maximum Capacity

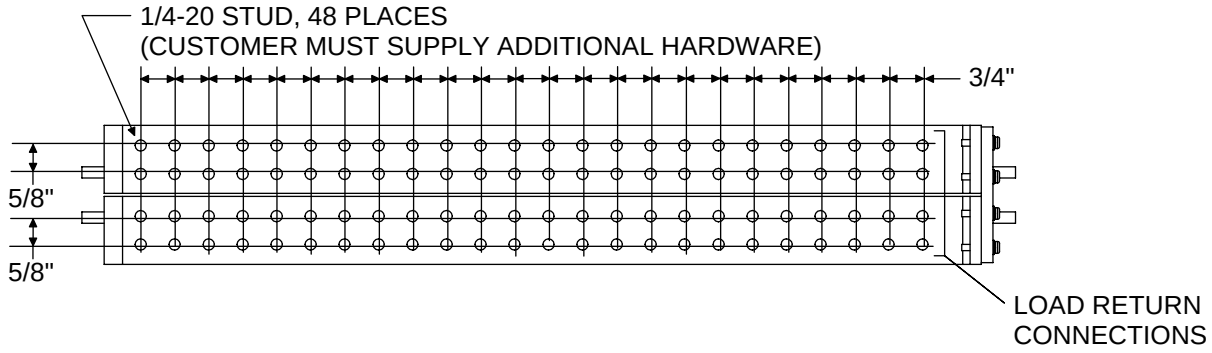
Restrictions

Can be installed in a 2- or 3-bus row cabinet (List 22 or 23). Must be installed in top row.

Must be installed in the same bus row as a List AK.

Ordering Notes

1) To terminate load returns within the distribution cabinet, order one (1) List AL for up to two (2) List AK.



List AM: Distribution Bus Module (P/N 524632)
(20) Fuse/Circuit Breaker System Positions
(1) 3-Pole Input Disconnect Fuse/Circuit Breaker Position

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (20) Load Distribution Fuse / Circuit Breaker Mounting Positions (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers), or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".
- (1) Input Disconnect Fuse / Circuit Breaker 3-Pole Mounting Position (3 to 100A TPS/TLS-Type Fuse / 1 to 250A Bullet Nose Type Circuit Breaker). Disconnects all loads in row from system main bus.

Restrictions

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3-, or 4-bus row cabinet.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

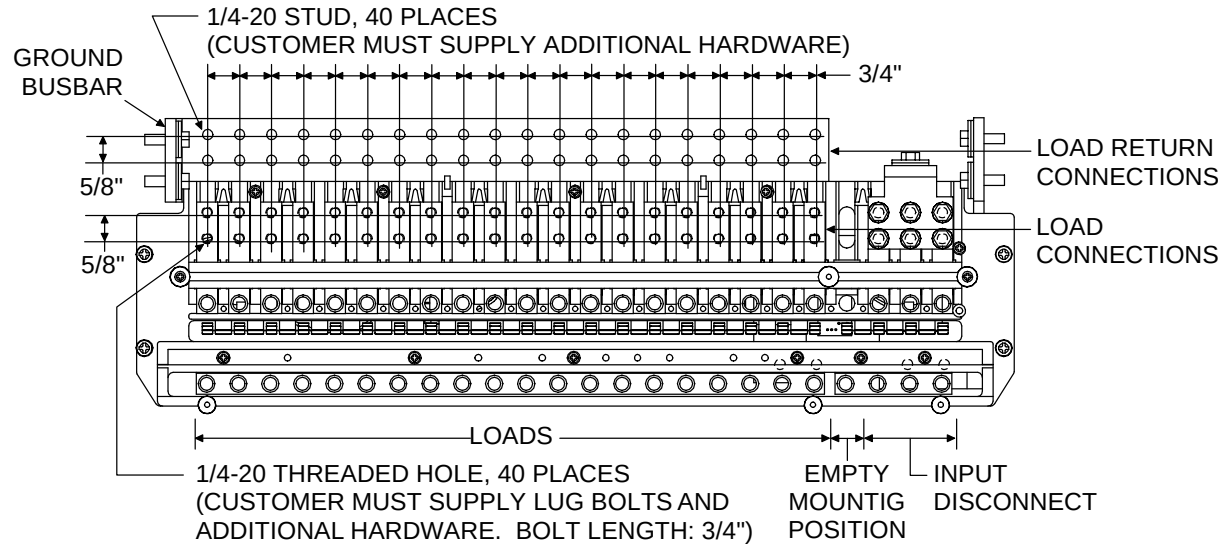
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332, as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List BA: Distribution Bus Module (P/N 520534)
(12) Fuse/Circuit Breaker System Positions with LVD
(8) Fuse/Circuit Breaker System Positions without LVD

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (12) LVD-Controlled Load Distribution Fuse / Circuit Breaker Mounting Positions (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers, or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".
- (8) Non-LVD-Controlled Load Distribution Fuse / Circuit Breaker Mounting Positions (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers, or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".
- Low Voltage Load Disconnect Contactor

Restrictions

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3-, or 4-bus row cabinet.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

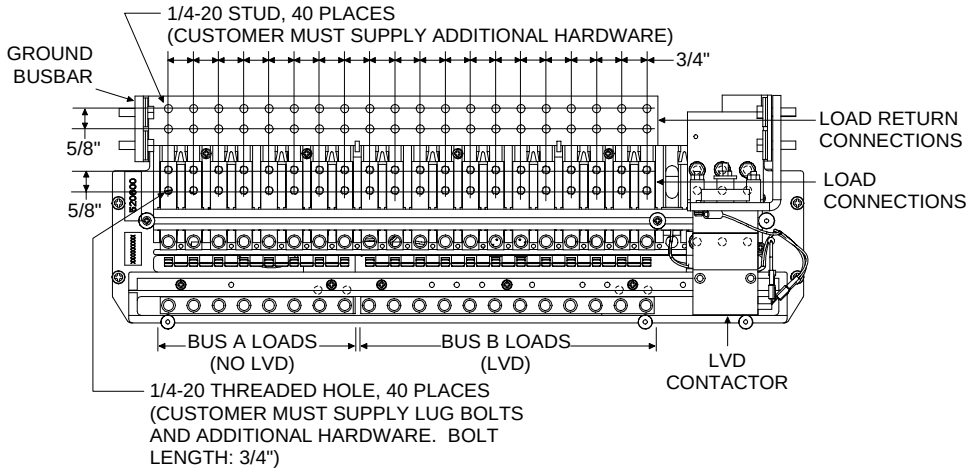
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332, as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List CA: Distribution Bus Module (P/N 509848)
(20) Fuse/Circuit Breaker System Positions w/LVLD

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (20) Load Distribution Fuse / Circuit Breaker Mounting Positions (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers), or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".
- Low Voltage Load Disconnect Contactor

Restrictions

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3-, or 4-bus row cabinet.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

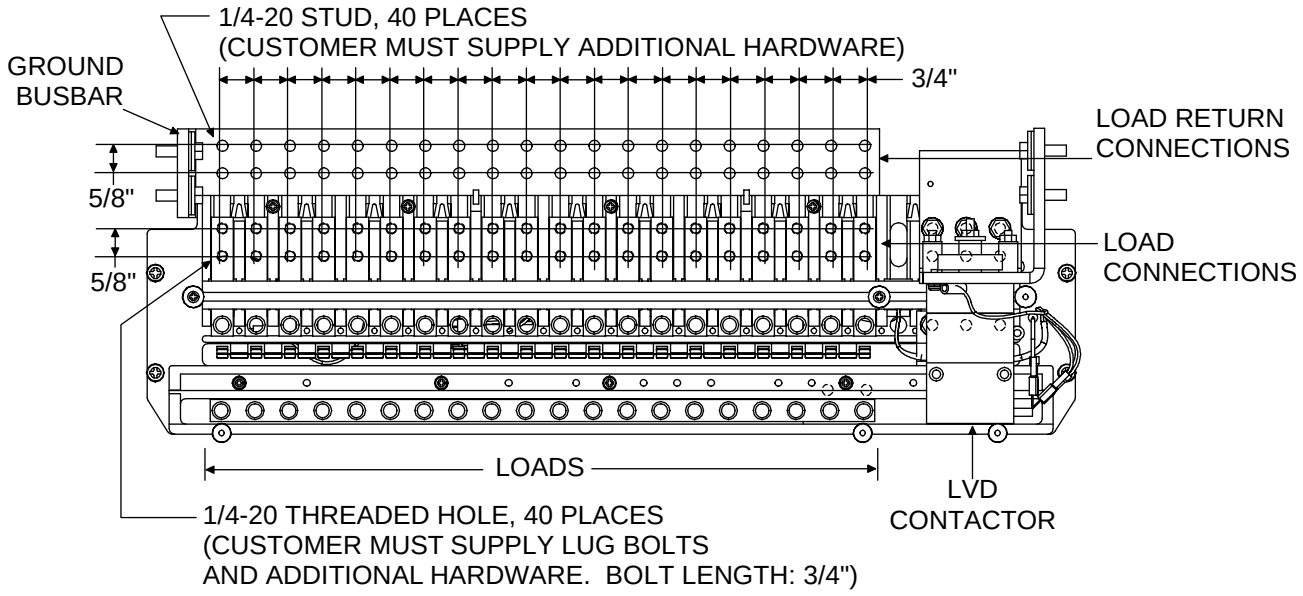
Circuit breakers with greater than 100 ampere rating occupy two mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332, as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List CB: Distribution Bus Module (P/N 513738)
(3) GJ/218 Circuit Breaker System Positions w/LVLD

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (3) Load Distribution Circuit Breaker Mounting Positions (100 to 600A GJ/218-Type) **NOTE RESTRICTIONS**
- Low Voltage Load Disconnect Contactor

Restrictions

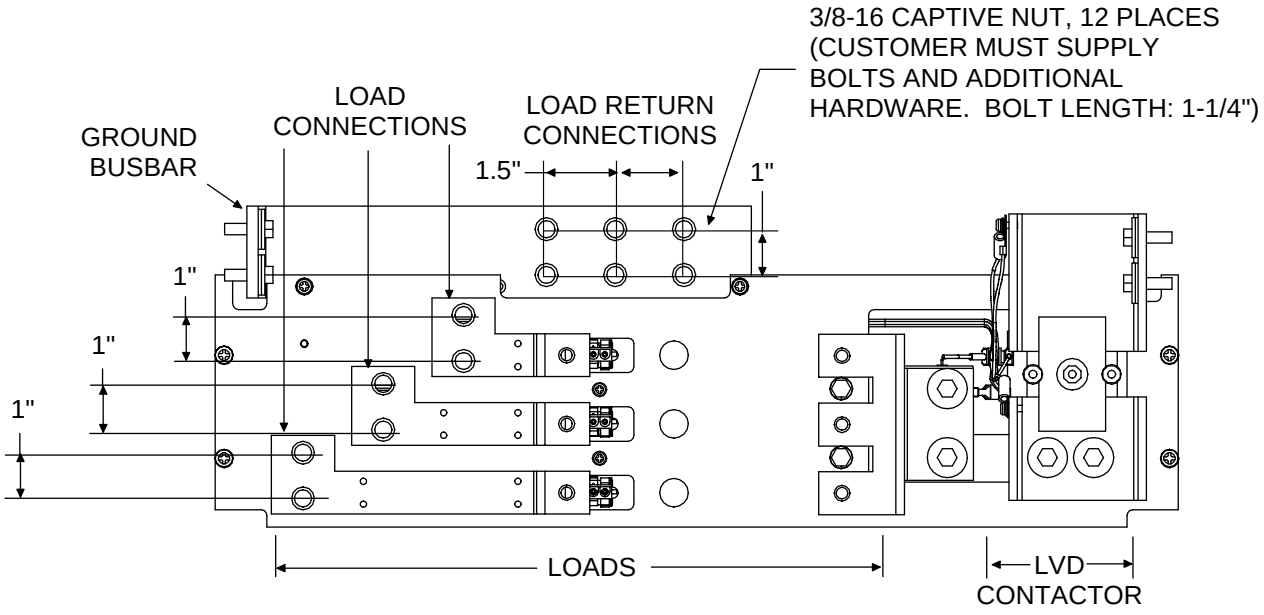
Can be installed in any bus position A-C (row 1-3) of a 1-, 2-, 3-, or 4-bus row cabinet. Cannot be installed in bus position D (row 4) of a four-bus row cabinet. See also List CD for similar application in bus position D (row 4).

Panel is designed to mount circuit breakers in the following possible combinations:

(3) 100A to 250A
(1) 100A to 250A and (1) 300A or 400A
(1) 600A

Ordering Notes

1) Order circuit breakers and associated jumper kits as required per Tables 5 and 6.
2) Order load lugs (two hole, 3/8" bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List CD: Distribution Bus Module (P/N 507200)
(3) GJ/218 Circuit Breaker System Positions w/LVLD

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (3) Load Distribution Circuit Breaker Mounting Positions (100 to 600A GJ/218-Type) **NOTE RESTRICTIONS.**
- Low Voltage Load Disconnect Contactor

Restrictions

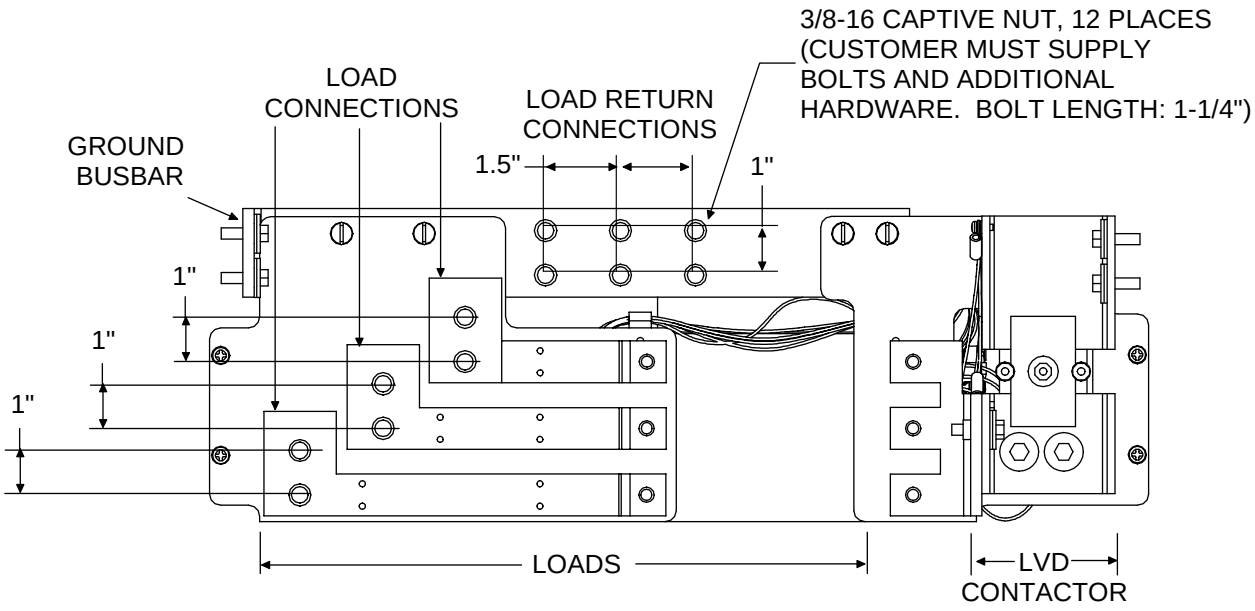
For use in a 4-bus row cabinet only. Must be installed in bus position D (row 4). See also List CB for similar application in bus positions A-C (rows 1-3).

Panel is designed to mount circuit breakers in the following possible combinations:

(3) 100A to 250A
(1) 100A to 250A and (1) 300A or 400A
(1) 600A

Ordering Notes

1) Order circuit breakers and associated jumper kits as required per Tables 5 and 6.
2) Order load lugs (two hole, 3/8" bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List CE: Distribution Bus Module (P/N 509564)
(8) GJ/218 Circuit Breaker System Positions w/LVLD (Upper Two Rows)

Features

- Single Voltage Distribution (+24V)
- 1,000A Maximum Capacity (500A per side)
- (8) Load Distribution Circuit Breaker Mounting Positions (100 to 600A GJ/218-Type) **NOTE RESTRICTIONS.**
- Low Voltage Load Disconnect Contactor

Restrictions

Occupies two distribution rows.

For use in a 4-bus row cabinet only. Must be installed in bus positions C and D (rows 3 and 4). See also List CF for similar application in bus positions A and B (rows 1 and 2).

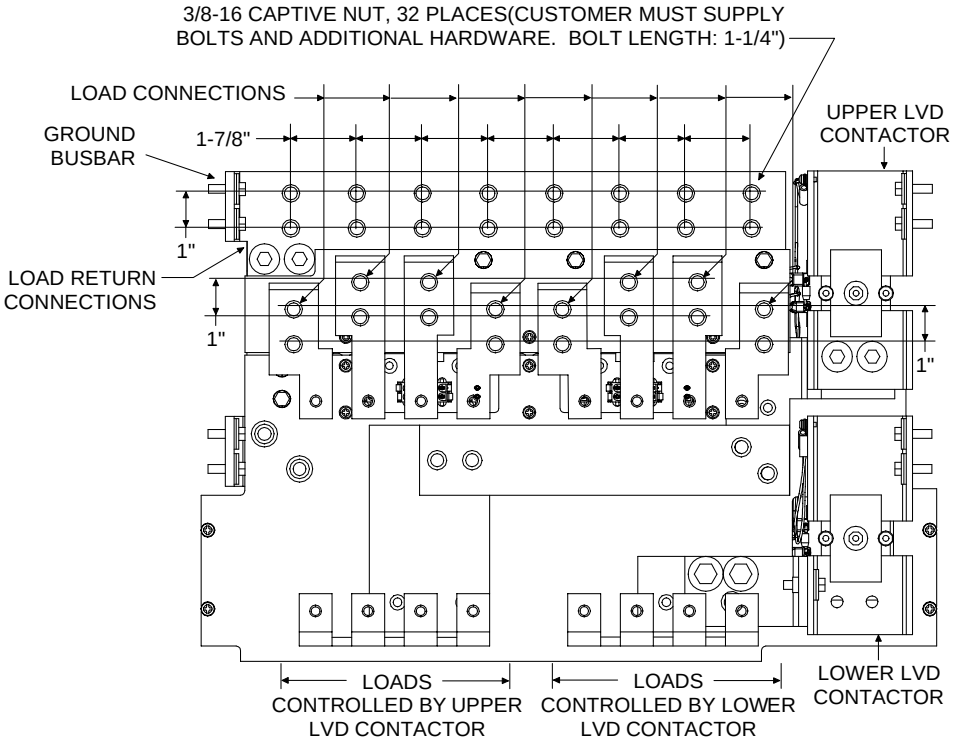
Panel is designed to mount circuit breakers in the following possible combinations **per side**:

(4) 100A to 250A
(2) 100A to 250A and (1) 300A or 400A
(2) 300A or 400A
(1) 600A and (1) 100A to 250A

Unless otherwise specified circuit breakers are divided between the two sides, and are mounted from left to right, starting with the highest capacity and working to the lowest capacity on each side.

Ordering Notes

1) Order circuit breakers and associated jumper kits as required per Tables 5 and 6.
2) Order load lugs (two hole, 3/8" bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List CF: Distribution Bus Module (P/N 509647)
(8) GJ/218 Circuit Breaker System Positions w/LVLD (Lower Two Rows)

Features

- Single Voltage Distribution (+24V)
- 1,000A Maximum Capacity (500A per side)
- (8) Load Distribution Circuit Breaker Mounting Positions (100 to 600A GJ/218-Type) **NOTE RESTRICTIONS.**
- Low Voltage Load Disconnect Contactor

Restrictions

Occupies two distribution rows.

For use in a 2-, 3-, or 4-bus row cabinet. Must be installed in bus positions A and B (rows 1 and 2), or B and C (rows 2 and 3). See also List CE for similar application in bus positions C and D (rows 3 and 4).

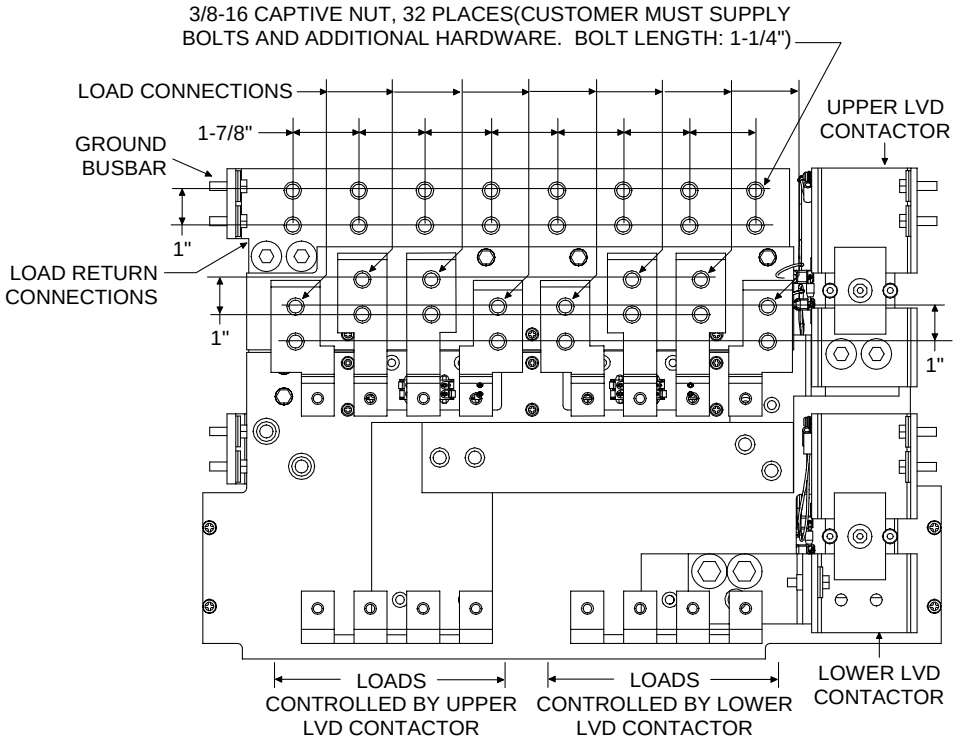
Panel is designed to mount circuit breakers in the following possible combinations **per side**:

(4) 100A to 250A
(2) 100A to 250A and (1) 300A or 400A
(2) 300A or 400A
(1) 600A and (1) 100A to 250A

Unless otherwise specified circuit breakers are divided between the two sides, and are mounted from left to right, starting with the highest capacity and working to the lowest capacity on each side.

Ordering Notes

1) Order circuit breakers and associated jumper kits as required per Tables 5 and 6.
2) Order load lugs (two hole, 3/8" bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List CG: Distribution Bus Module (P/N 514035) (2) TPH Distribution Fuse Positions w/LVLD

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (2) Distribution Fuse Mounting Positions (70 to 600A TPH-Type)
- Low Voltage Load Disconnect Contactor

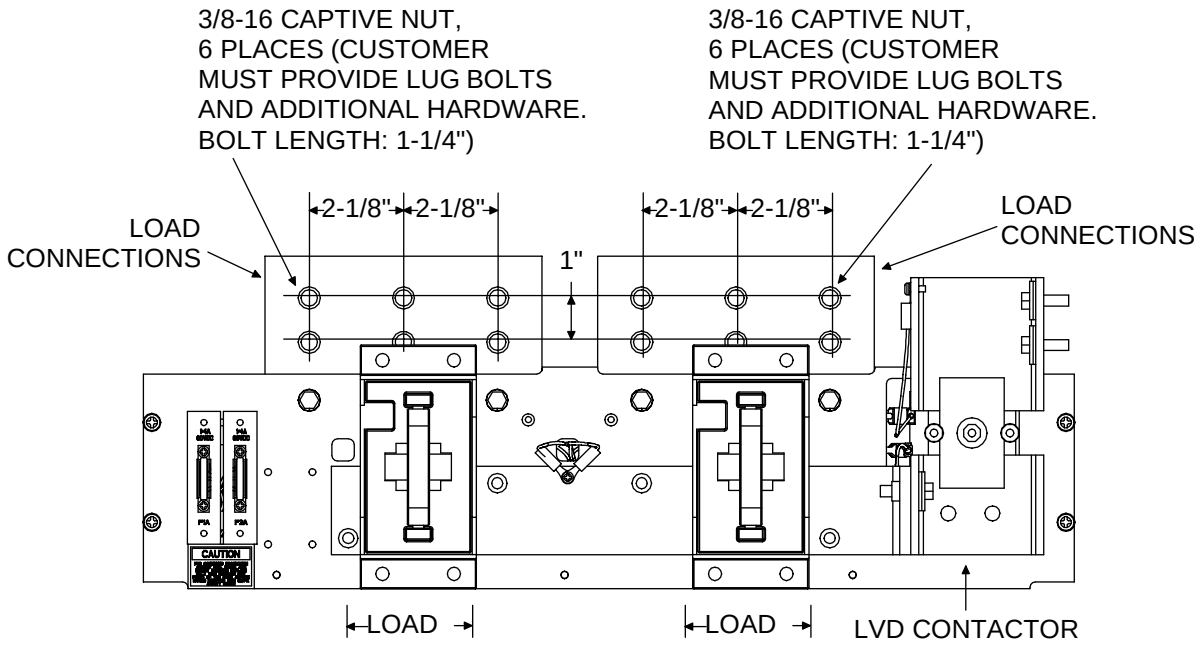
Restrictions

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3-, or 4-bus row cabinet.

Does not provide connection for load returns (see **Ordering Notes**).

Ordering Notes

1) To terminate load returns within the distribution cabinet, order one (1) List AH for up to two (2) List CG.
2) Order fuses as required per Table 4. Order replacement alarm fuses (1/4A) per Table 3.
3) Order load lugs (two hole, 3/8 bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List CJ: Distribution Bus Module (P/N 520936)
(2) TPH Distribution Fuse Positions with Load Metering Shunts and LVLD

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (2) Distribution Fuse Mounting Positions
  (70 to 600A TPH-Type)
- (1) Load Shunt (800A, 50mV) per load fuse is provided. Extended shunt leads are 22 AWG stranded wire, approximately 7-10 ft. long from exit point at bottom of Distribution Cabinet. Each shunt lead is equipped with a 49.9 ohm current limiting resistor.
- Low Voltage Load Disconnect Contactor

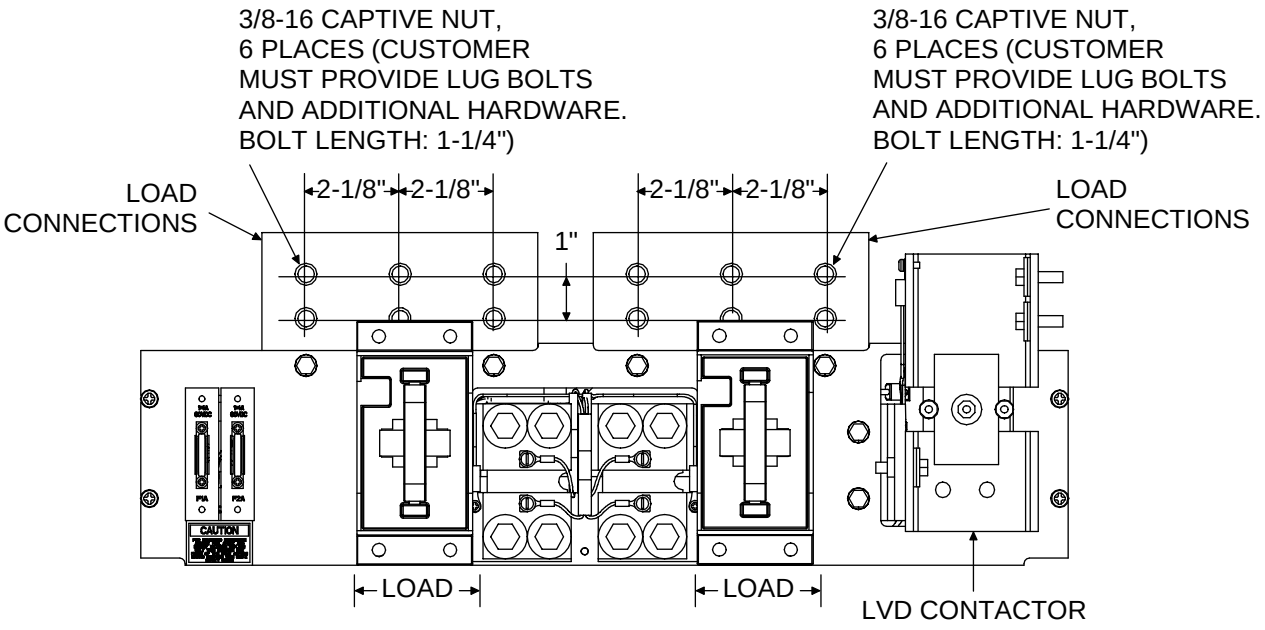
Restrictions

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3-, or 4-bus row cabinet.

Does not provide connection for load returns (see **Ordering Notes**).

Ordering Notes

1) To terminate load returns within the distribution cabinet, order one (1) List AH for up to two (2) List CJ.
2) Order fuses as required per Table 4. Order replacement alarm fuses (1/4A) per Table 3.
3) Order load lugs (two hole, 3/8 bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List EA: Distribution Bus Module (P/N 509852)
(16) Fuse/Circuit Breaker System Positions and (4) Fuse/Circuit Breaker Battery Disconnect Positions

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (16) Load Distribution Fuse / Circuit Breaker Mounting Positions (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers), or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".
- (4) Battery Disconnect Fuse / Circuit Breaker Mounting Positions
  (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose-Type Circuit Breakers)

Restrictions

Limit one bus arrangement of this type per Distribution Cabinet.

Must be installed in bus position A or B (row 1 or 2) of a 1-, 2-, 3-, or 4-bus row cabinet.

Cannot be used in second row of a 3-bus row cabinet in List 1 if used with List 2.

Cannot be used in second row of a 3-bus row cabinet in List 2.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

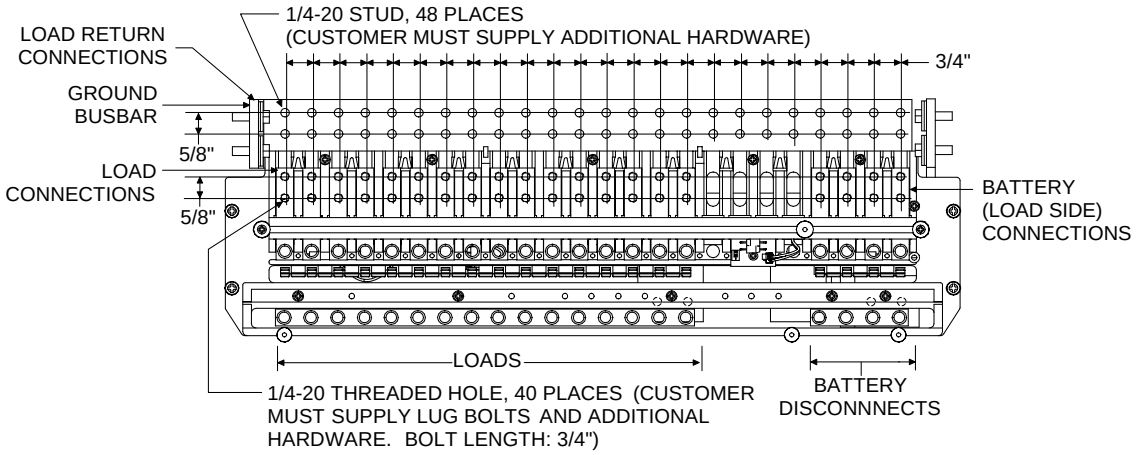
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332, as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List GB: Distribution Bus Module (P/N 513806)
(8) Fuse/Circuit Breaker System Positions w/LVD and (1) TPH Fuse Battery Disconnect Position

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (8) Load Distribution Fuse / Circuit Breaker Mounting Positions (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers), or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".
- (1) Battery Disconnect Fuse Mounting Position (70 to 600A TPH-Type)
- Low Voltage Load Disconnect Contactor

Restrictions

Limit one bus arrangement of this type per Distribution Cabinet.

Must be installed in bus position A (row 1) of a 1-, 2-, 3-, or 4-bus row cabinet.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

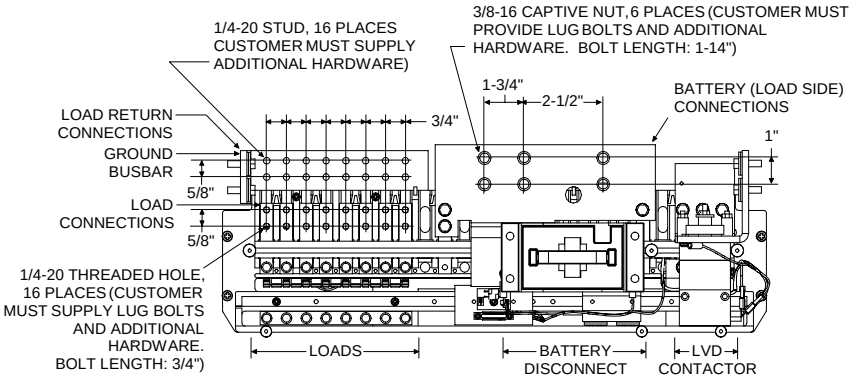
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single TPS/TLS-type fuseholder or Bullet Nose-type circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order load distribution fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order battery disconnect fuse as required per Table 4. Order replacement alarm fuse (1/4A) per Table 3.
4) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
5) Order battery lugs (two hole, 3/8 bolt clearance hole, 1" centers) as required for each distribution position per Table 10.
6) Order lug hardware kit, P/N 520332, as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List JA: Distribution Bus Module (Part No. 509906) (4) +24V Fuse/Circuit Breaker System Positions and (16) –48V Fuse/Circuit Breaker Subsystem Positions

Features

- Dual Voltage Distribution (+24V and -48V)
- 500A Maximum Total Capacity, 200A Maximum –48V Subsystem Capacity
- (4) Load Distribution Fuse / Circuit Breaker Mounting Positions (+24V System Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers)
- (16) Load Distribution Fuse / Circuit Breaker Mounting Positions (-48V Subsystem Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers, or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".

Restrictions

Limit one dual voltage bus (List JA, JB, JC, JD, KA, LB, LC) per power system.

Must be installed in Main Bay (List 1) **only**.

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3- or 4-bus row cabinet. If a distribution bus module is mounted directly beneath, that module must be a List AA, AE, AK, AM, BA, CA, CF, EA, NA, NB, RA, or RB. If ordering more than one (1) List 60, List JA must be installed in bus position A (row 1) of the distribution cabinet.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

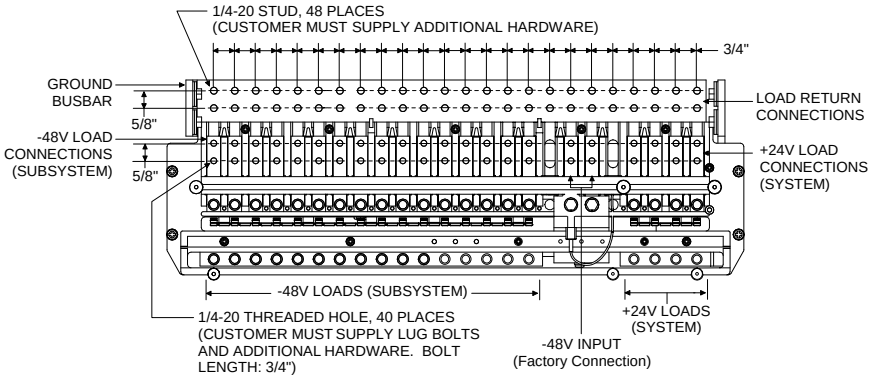
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332 as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List JB: Distribution Bus Module (Part No. 513808) (12) +24V Fuse/Circuit Breaker System Positions and (8) –48V Fuse/Circuit Breaker Subsystem Positions

Features

- Dual Voltage Distribution (+24V and -48V)
- 500A Maximum Total Capacity, 200A Maximum –48V Subsystem Capacity
- (12) Load Distribution Fuse / Circuit Breaker Mounting Positions (+24V System Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers, or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".
- (8) Load Distribution Fuse / Circuit Breaker Mounting Positions (-48V Subsystem Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers, or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".

Restrictions

Limit one dual voltage bus (List JA, JB, JC, JD, KA, LB, LC) per power system.

Must be installed in Main Bay (List 1) **only**.

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3- or 4-bus row cabinet. If a distribution bus module is mounted directly beneath, that module must be a List AA, AE, AK, AM, BA, CA, CF, EA, GB, NA, NB, RA, or RB. If ordering more than one (1) List 60, List JB must be installed in bus position A (row 1) of the distribution cabinet.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

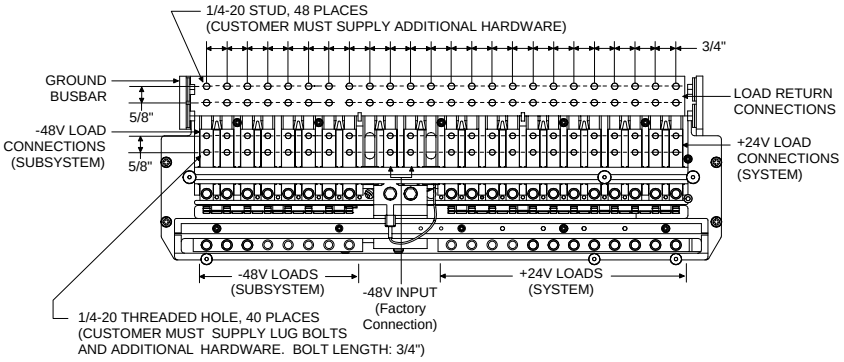
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332 as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List JC: Distribution Bus Module (Part No. 524403) (14) +24V Fuse/Circuit Breaker System Positions and (6) –48V Fuse/Circuit Breaker Subsystem Positions

Features

- Dual Voltage Distribution (+24V and -48V)
- 500A Maximum Total Capacity, 200A Maximum –48V Subsystem Capacity
- (14) Load Distribution Fuse / Circuit Breaker Mounting Positions (+24V System Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers, or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".
- (6) Load Distribution Fuse / Circuit Breaker Mounting Positions (-48V Subsystem Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers, or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".

Restrictions

Limit one dual voltage bus (List JA, JB, JC, JD, KA, LB, LC) per power system.

Must be installed in Main Bay (List 1) **only**.

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3- or 4-bus row cabinet. If a distribution bus module is mounted directly beneath, that module must be a List AA, AE, AK, AM, BA, CA, CF, EA, GB, NA, NB, RA, or RB. If ordering more than one (1) List 60, List JC must be installed in bus position A (row 1) of the distribution cabinet.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

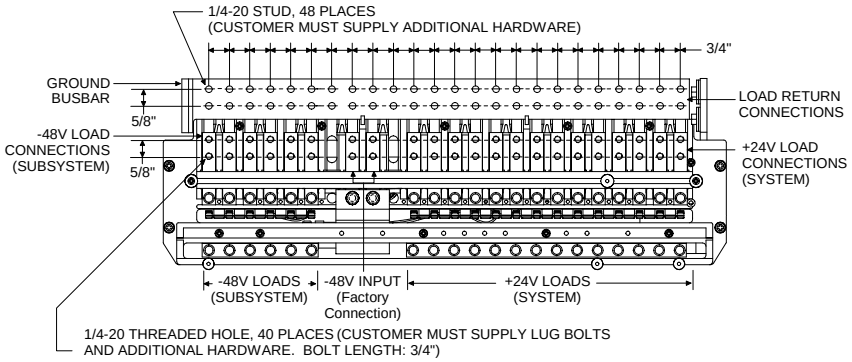
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332 as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List JD: Distribution Bus Module (Part No. 524788) (14) +24V Fuse/Circuit Breaker System Positions and (8) –48V Fuse/Circuit Breaker Subsystem Positions

Features

- Dual Voltage Distribution (+24V and –48V)
- 500A Maximum Total Capacity, 200A Maximum –48V Subsystem Capacity
- (14) Load Distribution Fuse / Circuit Breaker Mounting Positions (+24V System Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers, or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".
- (8) Load Distribution Fuse / Circuit Breaker Mounting Positions (–48V Subsystem Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers, or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".

Restrictions

Limit one dual voltage bus (List JA, JB, JC, JD, KA, LB, LC) per power system.

Must be installed in Main Bay (List 1) **only**.

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3- or 4-bus row cabinet. If a distribution bus module is mounted directly beneath, that module must be a List AA, AE, AK, AM, BA, CA, CF, EA, GB, NA, NB, RA, or RB. If ordering more than one (1) List 60, List JD must be installed in bus position A (row 1) of the distribution cabinet.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

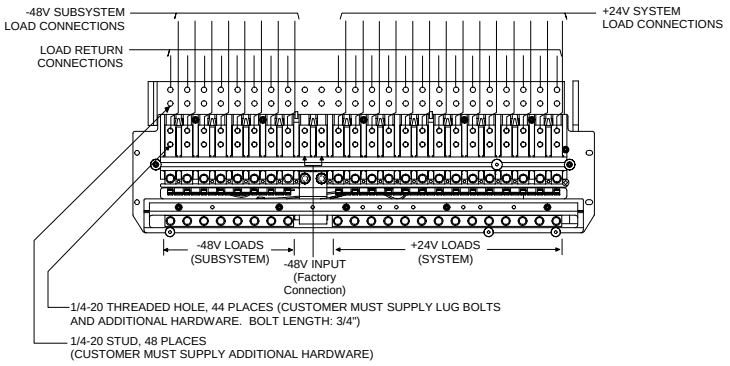
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332 as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List KA: Distribution Bus Module (Part No. 520507) (4) +24V Fuse/Circuit Breaker System Positions and (16) –48V Fuse/Circuit Breaker Subsystem Positions

Features

- Dual Voltage Distribution (+24V and -48V)
- 320A Maximum +24V System bus capacity, 480A Maximum –48V Subsystem bus capacity.
- (4) Load Distribution Fuse / Circuit Breaker Mounting Positions (+24V System Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers.
- (16) Load Distribution Fuse / Circuit Breaker Mounting Positions (-48V Subsystem Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers, or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".

Restrictions

Limit one dual voltage bus (List JA, JB, JC, JD, KA, LB, LC) per power system.

Must be installed in Main Bay (List 1) **only**.

Must be installed in bus position A (row 1) of a 1-, 2-, 3- or 4-bus row cabinet.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

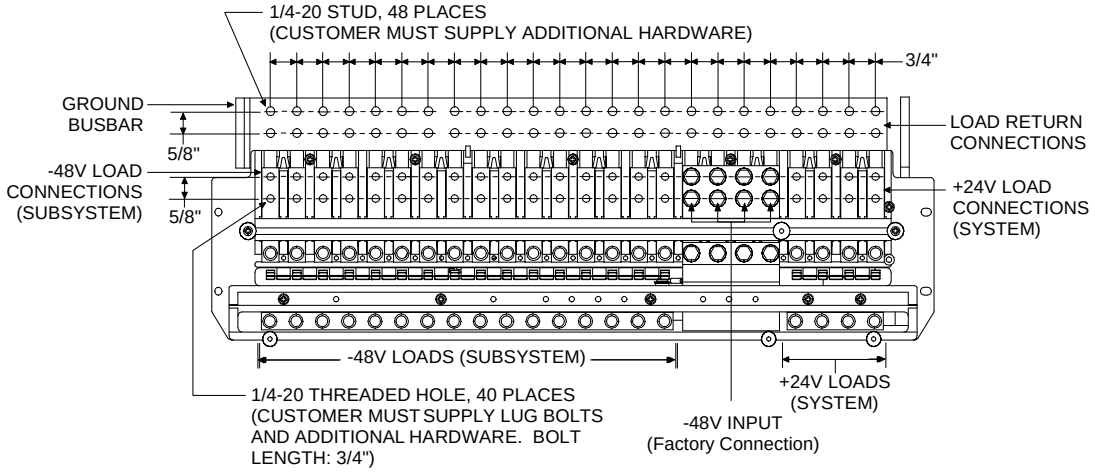
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332 as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List LB: Distribution Bus Module (Part No. 513807) (8) +24V Fuse/Circuit Breaker System Positions w/LVD and (8) –48V Fuse/Circuit Breaker Subsystem Positions

Features

- Dual Voltage Distribution (+24V and -48V)
- 500A Maximum Total Capacity, 200A Maximum –48V Subsystem Capacity
- (8) Load Distribution Fuse / Circuit Breaker Mounting Positions (+24V System Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers, or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".
- (8) Load Distribution Fuse / Circuit Breaker Mounting Positions (-48V Subsystem Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers, or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".
- Low Voltage System Load Disconnect Contactor

Restrictions

Limit one dual voltage bus (List JA, JB, JC, JD, KA, LB, LC) per power system.

Must be installed in Main Bay (List 1) **only**.

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3- or 4-bus row cabinet. If a distribution bus module is mounted directly beneath, that module must be a List AA, AE, AK, AM, BA, CA, CF, EA, GB, NA, NB, RA, or RB. If ordering more than one (1) List 60, List LB must be installed in bus position A (row 1) of the distribution cabinet.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

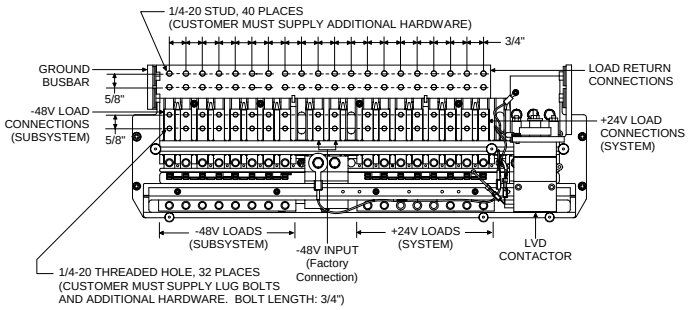
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332 as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List LC: Distribution Bus Module (Part No. 514623) (12) +24V Fuse/Circuit Breaker System Positions w/LVD and (4) –48V Fuse/Circuit Breaker Subsystem Positions

Features

- Dual Voltage Distribution (+24V and -48V)
- 500A Maximum Total Capacity, 200A Maximum –48V Subsystem Capacity
- (12) Load Distribution Fuse / Circuit Breaker Mounting Positions (+24V System Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers, or accepts "GMT Load Distribution Fuse Block Assembly Kit (P/N 514432)".
- (4) Load Distribution Fuse / Circuit Breaker Mounting Positions (-48V Subsystem Voltage) (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose Type Circuit Breakers.
- Low Voltage System Load Disconnect Contactor

Restrictions

Limit one dual voltage bus (List JA, JB, JC, JD, KA, LB, LC) per power system.

Must be installed in Main Bay (List 1) **only**.

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3- or 4-bus row cabinet. If a distribution bus module is mounted directly beneath, that module must be a List AA, AE, AK, AM, BA, CA, CF, EA, GB, NA, NB, RA, or RB. If ordering more than one (1) List 60, List LC must be installed in bus position A (row 1) of the distribution cabinet.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

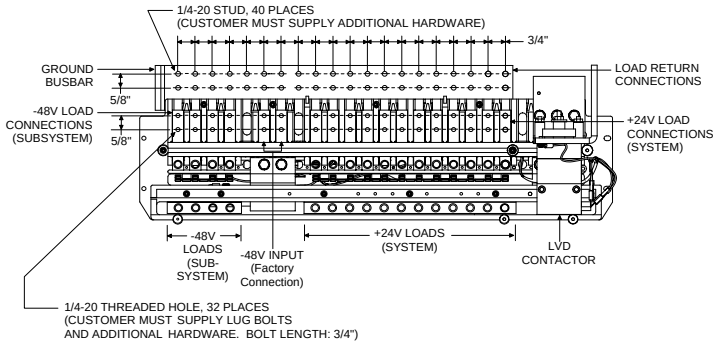
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 AWG.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order load lugs (two hole, 1/4" bolt clearance hole, 5/8" centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332 as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List NA: Distribution Bus Module (P/N 514336)
(20) Fuse/Circuit Breaker Battery Disconnect Positions

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (20) Battery Disconnect Fuse / Circuit Breaker Mounting Positions
  (3 to 100A TPS/TLS-Type Fuses / 1 to 250A Bullet Nose-Type Circuit Breakers)

Restrictions

Limit one bus arrangement of this type per Distribution Cabinet.

Must be installed in bus position A (row 1) of a 1-, 2-, 3-, or 4-bus row cabinet.

Unless otherwise specified fuses and/or circuit breakers are mounted from left to right, starting with the highest capacity and working to the lowest capacity.

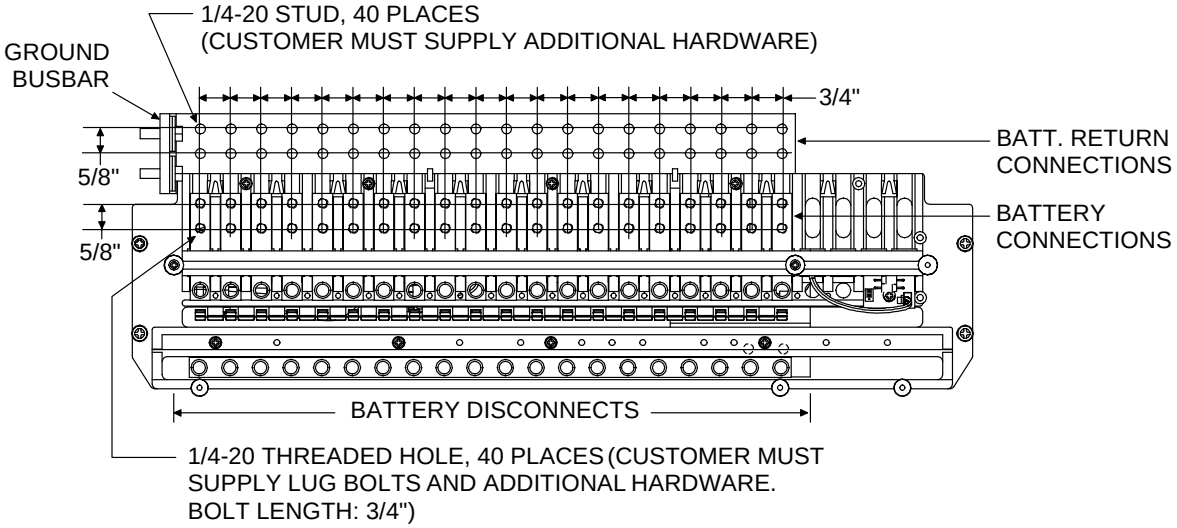
125A, 150A, and 200A circuit breakers occupy two mounting positions. 250A circuit breakers occupy three mounting positions.

Caution: ***A circuit breaker or fuse with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Maximum size of wire to be connected to a single fuseholder or circuit breaker position is 2 gauge.

Ordering Notes

1) Order circuit breakers as required per Table 7.
2) Order fuses as required per Table 8.
   Also order one (1) P/N 117201 bullet nose-type fuseholder per fuse ordered.
3) Order battery and return lugs (two hole, 1/4” bolt clearance hole, 5/8” centers) as required for each distribution position per Table 9 or 11.
4) Order lug hardware kit, P/N 520332, as required. Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly.



List NB: Distribution Bus Module (P/N 513809)
(3) GJ/218 Circuit Breaker Battery Disconnect Positions

Features

- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (3) Battery Disconnect Circuit Breaker Mounting Positions (100 to 600A GJ/218-Type) **NOTE RESTRICTIONS**

Restrictions

Limit one bus arrangement of this type per Distribution Cabinet.

Must be installed in bus position A or B (row 1 or 2) of a 1-, 2-, 3-, or 4-bus row cabinet.

Cannot be used in second row of a 3-bus row cabinet in List 1 if used with List 2.

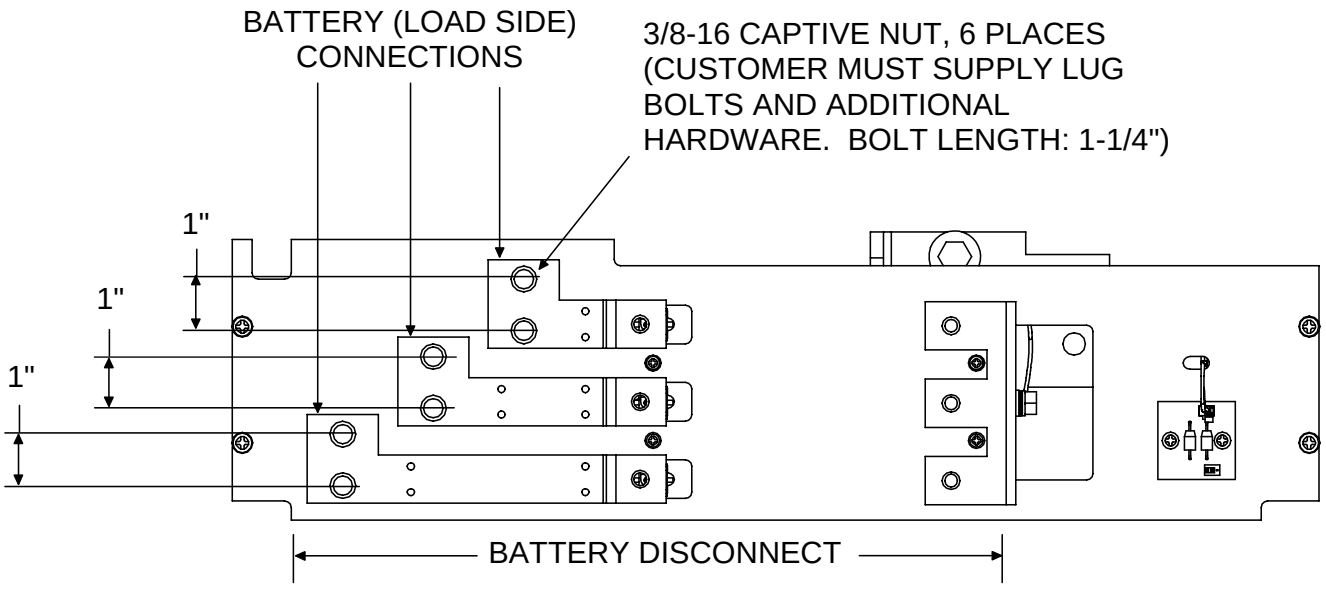
Cannot be used in second row of a 3-bus row cabinet in List 2.

Panel is designed to mount circuit breakers in the following possible combinations:

(3) 100A to 250A
(1) 100A to 250A and (1) 300A or 400A
(1) 600A

Ordering Notes

1) Order circuit breakers and associated jumper kits as required per Tables 5 and 6.
2) Order battery lugs (two hole, 3/8" bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List NC: Distribution Bus Module (P/N 514025)
(1) TPH Fuse Battery Disconnect Position

Features

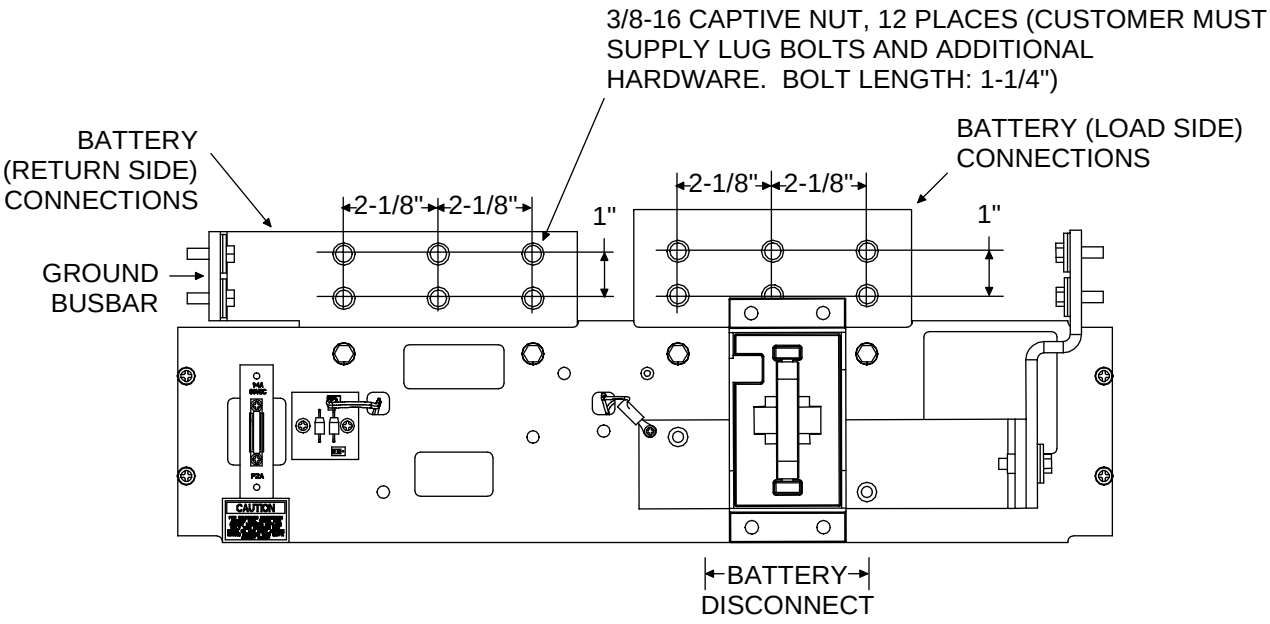
- Single Voltage Distribution (+24V)
- 500A Maximum Capacity
- (1) Battery Disconnect Fuse Mounting Position
  (70 to 600A TPH-Type)

Restrictions

Can be installed in any bus position A-D (row 1-4) of a 1-, 2-, 3-, or 4-bus row cabinet.

Ordering Notes

1) Order fuses as required per Table 4. Order replacement alarm fuses (1/4A) per Table 3.
2) Order battery lugs (two hole, 3/8 bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List ND: Distribution Bus Module (P/N 514030)
(2) TPH Fuse Battery Disconnect Positions

Features

- Single Voltage Distribution (+24V)
- 960A Maximum Capacity
- (2) Battery Disconnect Fuse Mounting Positions
  (70 to 600A TPH-Type)

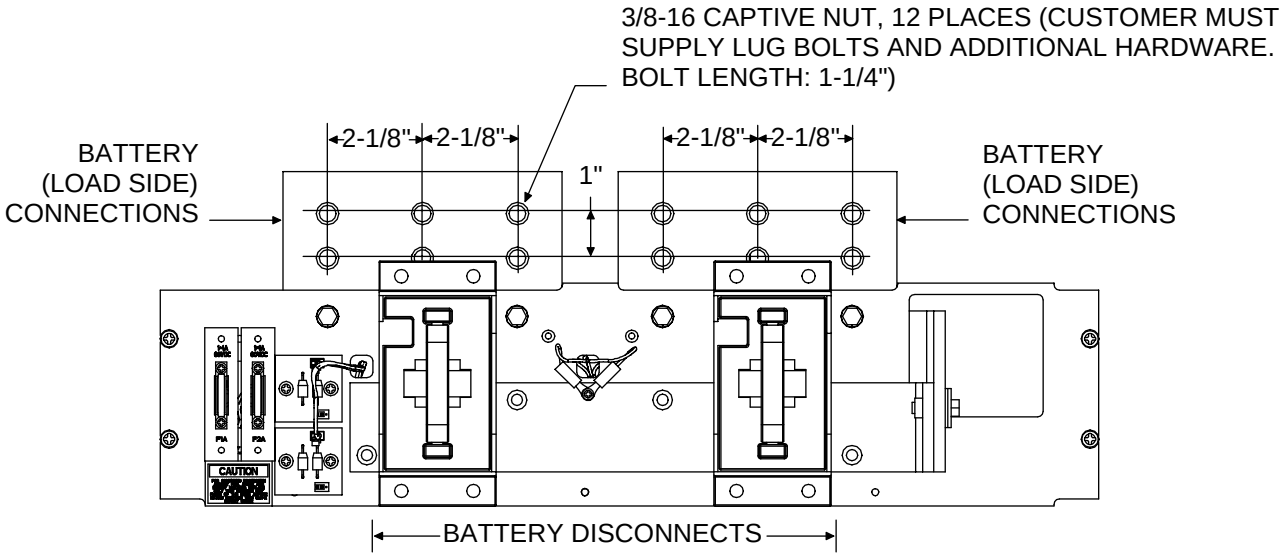
Restrictions

Limit one bus arrangement of this type per Distribution Cabinet.

Must be installed in bus position A (row 1) of a 1-, 2-, 3-, or 4-bus row cabinet.

Ordering Notes

1) Order fuses as required per Table 4. Order replacement alarm fuses (1/4A) per Table 3.
2) Order battery lugs (two hole, 3/8 bolt clearance hole, 1" centers) as required for each distribution position per Table 10.



List RA: 1200A Low Voltage Battery Disconnect (LVBD) Contactor and Control Circuit (P/N 540808)

Features

- Provides a battery disconnect contactor, which is mounted in bus position A (row 1) of the Distribution Cabinet.

Restrictions

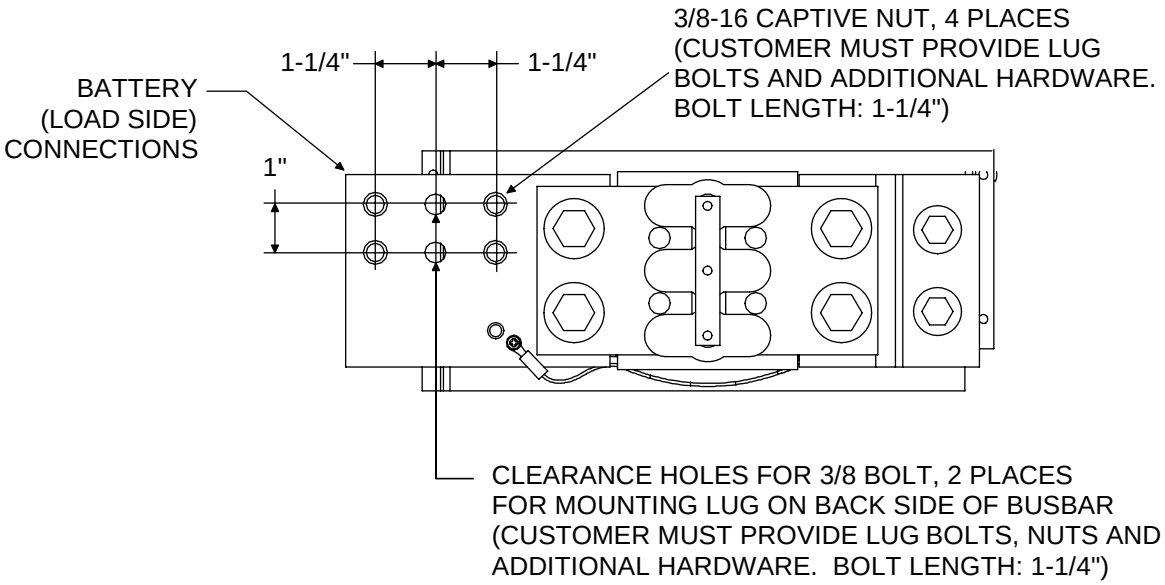
Limit one bus arrangement of this type per System.

Must be installed in bus position A (row 1) of a 1-, 2-, 3-, or 4-bus row cabinet.

Cannot be used with List 92, 93, RB, RC, RD, or RE.

Ordering Notes

1) Order as required.
2) Order battery lugs (two hole, 3/8 bolt clearance hole, 1” centers) as required Table 10.



List RB: 1200A Manual Battery Disconnect Contactor with Local and Remote Alarm (P/N 540809)

Features

- Provides a battery disconnect contactor with manual control circuit, which is mounted in bus position A (row 1) of the Distribution Cabinet.
- Also provides one set of Form C relay contacts for connection to customer external alarms.

Restrictions

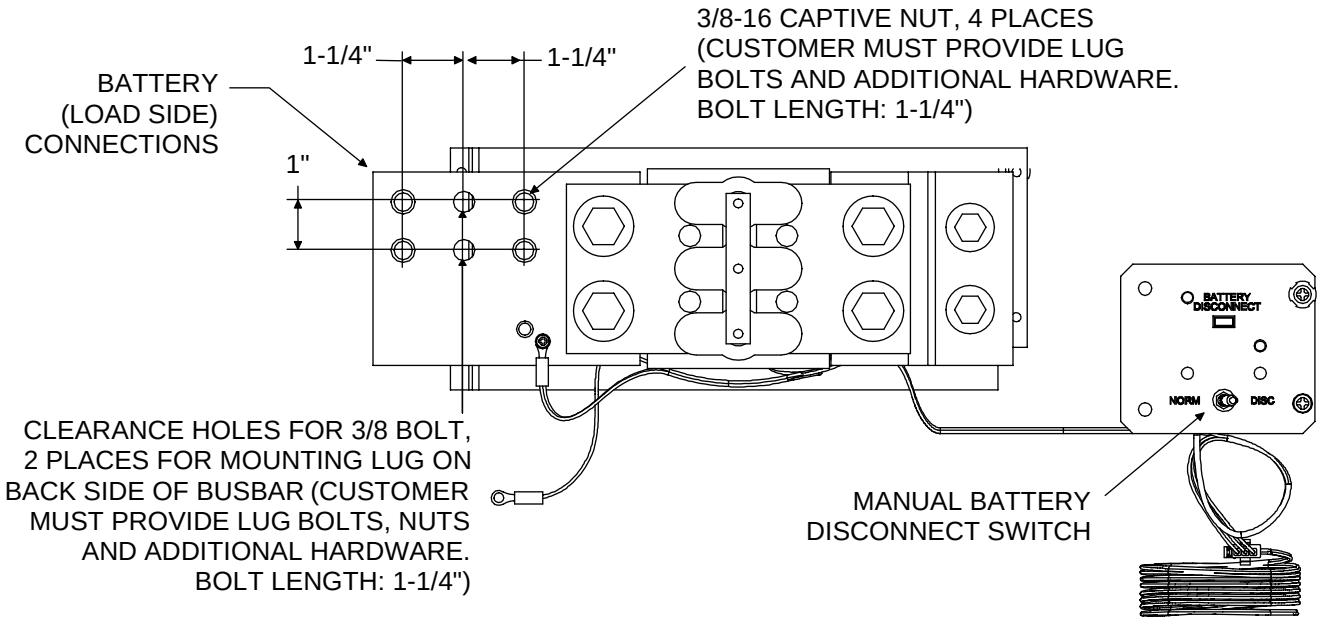
Limit one bus arrangement of this type per System.

Must be installed in bus position A (row 1) of a 1-, 2-, 3-, or 4-bus row cabinet.

Cannot be used with List 92, 93, RA, RC, RD, or RE.

Ordering Notes

1) Order as required.
2) Order battery lugs (two hole, 3/8 bolt clearance hole, 1" centers) as required Table 10.



List RC: 2000A Manual Battery Disconnect Contactor with Local and Remote Alarm (P/N 528446)

Features

- Provides a battery disconnect contactor with manual control circuit.
- Mounted on external rear of the Distribution Cabinet; uses no distribution row positions inside cabinet.
- Includes (1) extension plate (P/N 514713) for the Distribution Cabinet ground return busbar. Plate provides three pairs of clearance holes for 3/8" hardware on 1" centers. Allows back-to-back lug landing for up to six lugs. See "Electrical Connection Locations and Dimensions, Input Battery (Connections to Optional Battery Busbar Extension Kit P/N 514713 Installed in Lists 21 through 24 Distribution Cabinets)" under PHYSICAL SIZE INFORMATION for a dimensional drawing.
- Also provides one set of Form C relay contacts for connection to customer external alarms.

Restrictions

Must be installed in Main Bay (List 1) **only**.

Limit one List RC per Distribution Cabinet.

Cannot be used in a 1-bus row cabinet.

Cannot be used if List 1 is used with List 2. (**Can** be used if List 1 is used alone or with List 5.)

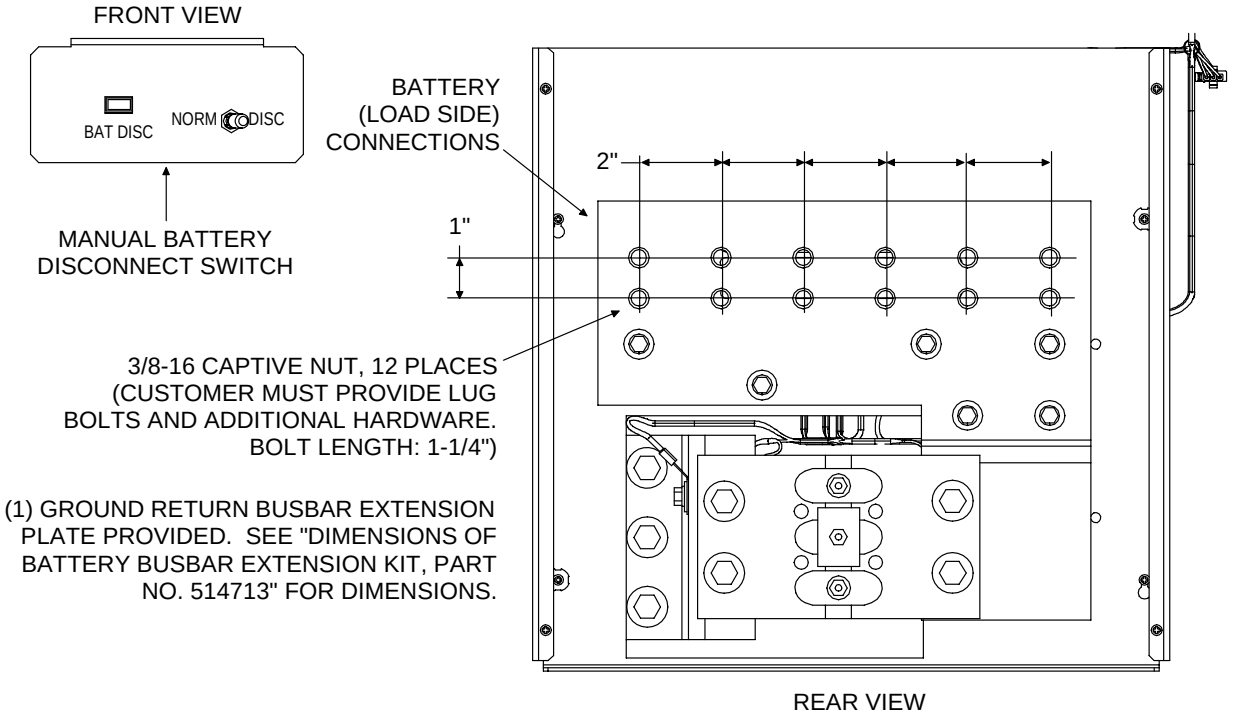
Cannot be used with List 92, 93, RA, RB, RD, or RE.

Rear access required for installation and maintenance.

Ordering Notes

1) Order as required.

2) Order battery lugs (two hole, 3/8 bolt clearance hole, 1" centers) as required Table 10.



List RD: 2000A Low Voltage/Manual Battery Disconnect Contactor with Battery Current Monitoring (P/N 528447)

Features

- Provides a battery disconnect contactor with Low Voltage and manual control.
- Includes shunt for battery charge/discharge current monitoring (25mV @ 2000A).
- Mounted on external rear of the Distribution Cabinet; uses no distribution row positions inside cabinet.
- Includes (1) extension plate (P/N 514713) for the Distribution Cabinet ground return busbar. Plate provides three pairs of clearance holes for 3/8" hardware on 1" centers. Allows back-to-back lug landing for up to six lugs. See "Electrical Connection Locations and Dimensions, Input Battery (Connections to Optional Battery Busbar Extension Kit P/N 514713 Installed in Lists 21 through 24 Distribution Cabinets)" under PHYSICAL SIZE INFORMATION for a dimensional drawing.
- Also provides one set of Form C relay contacts for connection to customer external alarms.

Restrictions

Must be installed in Main Bay (List 1) **only**.

Limit one List RD per Distribution Cabinet.

Cannot be used in a 1-bus row cabinet.

Cannot be used if List 1 is used with List 2. (**Can** be used if List 1 is used alone or with List 5.)

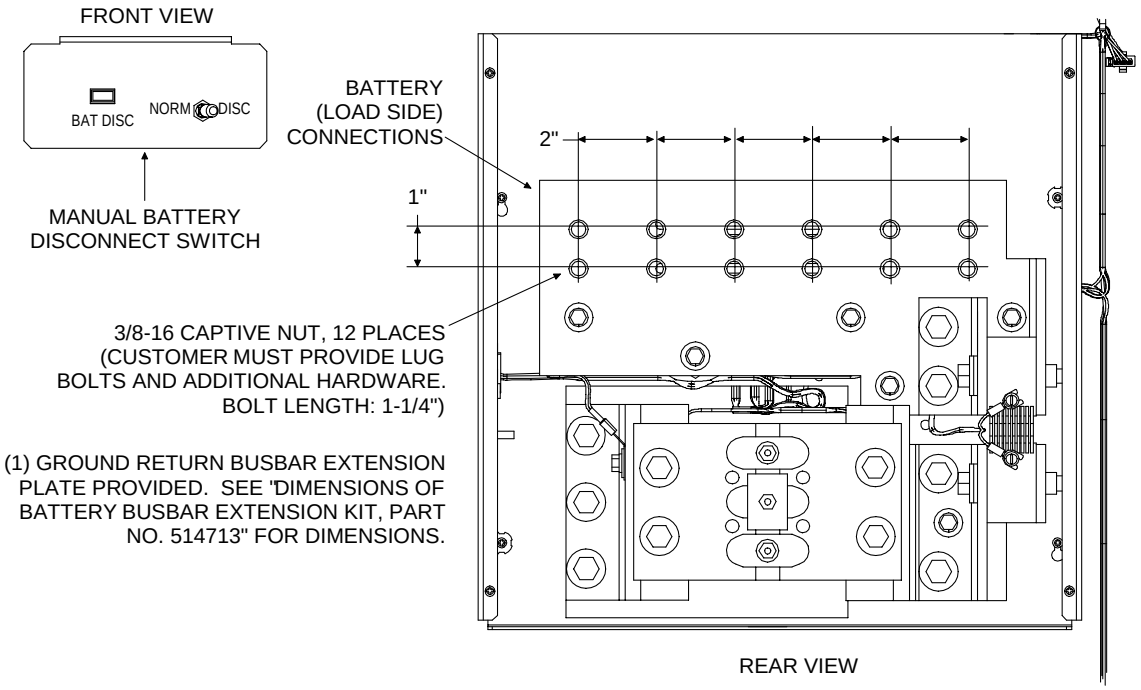
Cannot be used with List 92, 93, RA, RB, RC, or RE.

Rear access required for installation and maintenance.

Ordering Notes

1) Order as required.

2) Order battery lugs (two hole, 3/8 bolt clearance hole, 1" centers) as required Table 10.



List RE: 2000A Low Voltage Battery Disconnect Contactor with Battery Current Monitoring (P/N 535064)

Features

- Provides a battery disconnect contactor with low voltage control.
- Includes shunt for battery charge/discharge current monitoring (25mV @ 2000A).
- Mounted on external rear of the Distribution Cabinet; uses no distribution row positions inside cabinet.
- Includes (1) extension plate (P/N 514713) for the Distribution Cabinet ground return busbar. Plate provides three pairs of clearance holes for 3/8" hardware on 1" centers. Allows back-to-back lug landing for up to six lugs. See "Electrical Connection Locations and Dimensions, Input Battery (Connections to Optional Battery Busbar Extension Kit P/N 514713 Installed in Lists 21 through 24 Distribution Cabinets)" under PHYSICAL SIZE INFORMATION for a dimensional drawing.
- Also provides one set of Form C relay contacts for connection to customer external alarms.

Restrictions

Same as List RD except does NOT include manual battery disconnect switch.

Must be installed in Main Bay (List 1) **only**.

Limit one List RE per Distribution Cabinet.

Cannot be used in a 1-bus row cabinet.

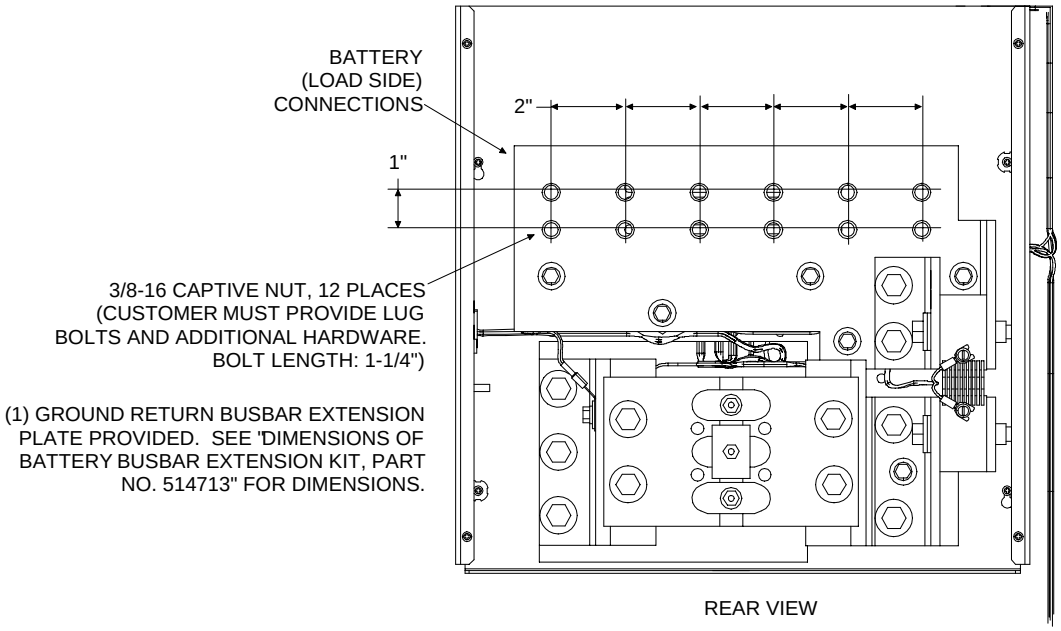
Cannot be used if List 1 is used with List 2. (**Can** be used if List 1 is used alone or with List 5.)

Cannot be used with List 92, 93, RA, RB, RC, or RD.

Rear access required for installation and maintenance.

Ordering Notes

1) Order as required.
2) Order battery lugs (two hole, 3/8 bolt clearance hole, 1" centers) as required Table 10.



REAR VIEW

ACCESSORY DESCRIPTIONS

Relay Racks

Features

- The system is factory mounted to the relay rack specified when ordered.
- System components may be ordered without a relay rack. When ordered without a relay rack, the system is mounted on shipping brackets bolted to a shipping skid. The shipping brackets can mount a system up to 20U high.

Ordering Notes

1) Order from relay racks listed in Table 1.

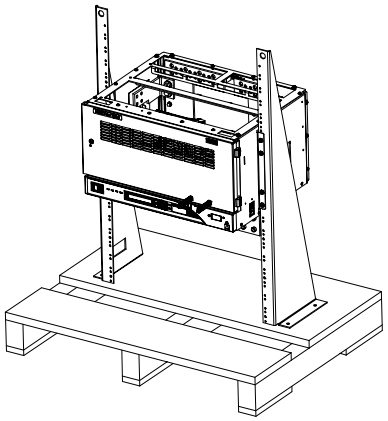
Part Number	Size	Available Mounting Positions (1RU = 1-3/4")	Notes
543151	25.656"H x 23"W	13RU	Welded (Notes 1, 3)
543152	27.406"H x 23"W	14RU	Welded (Notes 1, 3)
543153	36.156"H x 23"W	19RU	Welded (Notes 1, 3)
543154	39.656"H x 23"W	21RU	Welded (Notes 1, 3)
543155	43.156"H x 23"W	23RU	Welded (Notes 1, 3)
543156	51.906"H x 23"W	28RU	Welded
543157	71.156"H x 23"W	39RU	Welded
543161	6'0"H x 23"W	37RU	Welded
543162	7'0"H x 23"W	45RU	Welded
541340	7'0"H x 23"W	45RU	Seismic (Notes 1, 2, and 3)
543163	7'6"H x 23"W	48RU	Welded
543164	8'0""H x 23"W	51RU	Welded

Note 1: *Complies with Bellcore Seismic Zone 4 requirements.*

Note 2: *The DC output cabling may be restricted by the top angle of the relay rack.*

Note 3: *Seismic (Zone 4) compliant ONLY when system DOES NOT contain any of the following components:* List 93 Battery Tray

Table 1
Available Relay Racks



Ship Loose Option

Transition Plates to Mount Relay Rack on Top of GNB Absolyte IIP Batteries

Features

- Transition Plate Kits can be ordered to mount relay rack P/Ns 543151, 543152, 543153, 543154, 543155, 543156, and 543157 on top of GNB Absolyte IIP Battery Stands.
- Each kit consists of two transition plates with three hole patterns and hardware (3/8") to mount the plates to the above listed relay racks. Customer must supply hardware to mount the transition plates to the battery stands.

Restrictions

Used with relay rack P/Ns 543151, 543152, 543153, 543154, 543155, 543156, and 543157only.

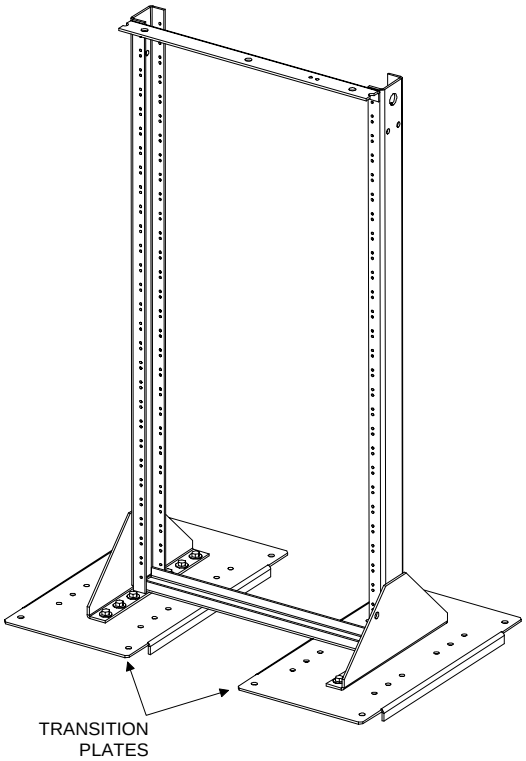
Ordering Notes

1) Order P/N 509819 for a Transition Plate Kit to mount relay rack on top of battery with outside dimensions of…

   26.75" x 26.38",
   35.75" x 26.38", or
   42.50" x 26.38".

2) Order P/N 514880 for a Transition Plate Kit to mount relay rack on top of battery with outside dimensions of…

   29.00" x 26.38",
   35.50" x 26.35", or
   40.25" x 26.38".



Distribution Devices

GMT Load Distribution Fuse Block Assembly Kit (P/N 514432) (10) GMT Fuse Positions

Features

- Provides ten (10) load distribution fuse positions (1/4A to 15A GMT alarm-type fuses).
- Single voltage distribution (+24V).
- Mounts in five (5) distribution positions of any “Bullet Nose” Distribution Bus Module.
- Screw clamp type load and load return terminals provided.
- Includes ten (10) dummy fuses equipped with safety fuse covers.
- Includes 35A input fuse and associate alarm fuse.

Restrictions

30A maximum capacity.

Terminal block wire size capacity: 24 to 14 AWG.

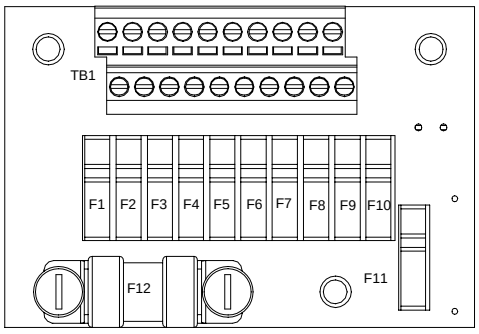
Can be used in a List AA, AK, AM, BA, CA, EA, GB, JA, JB, JC, JD, KA, LB, and LC Distribution Bus Module only.

When factory-ordered, installation order of the assembly will be from top to bottom and right to left (see illustration below for 4-row example), unless otherwise specified.

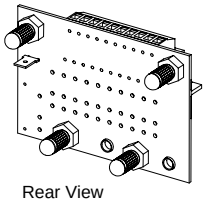
Ordering Notes

1) Order kit P/N 514432 as required. Provides one (1) 10-Position GMT Fuse Distribution Assembly P/N 509128, one (1) Ground Return Link, and hardware.
2) Order fuses as required per Table 2 (GMT Fuses).
3) Located on the P/N 509128 Assembly is an input fuse. If this fuse opens, an alarm type fuse (fuse position #11) also opens to activate the system fuse alarm circuit. For replacement fuses, order as follows:

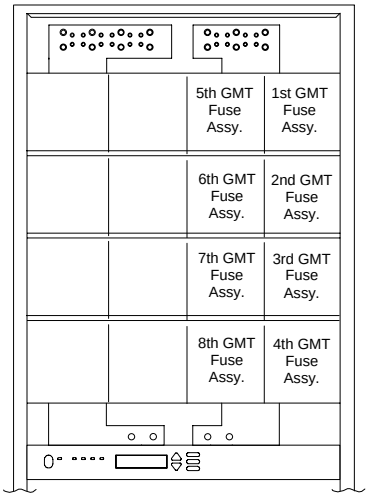
   Input Fuse F12: P/N 110982 (Bussmann TPS-35LB, 35A)
   Alarm Fuse F11: P/N 248610200 (Bussmann GMT-1/4, 1/4A)



Part No. 509128



Rear View



Mounting Order for Multiple Part No. 509128
(4 Row Cabinet Shown)

GMT-Type Load Distribution Fuses

Features

- An optional "GMT Load Distribution Fuse Block Assembly Kit" (see previous section) is available for additional load distribution.

Restrictions

When used for power distribution, load should not exceed 80% of device rating, except 10 and 15 amp fuses, for which load should not exceed 70% of device rating.

Ordering Notes

1) Order fuses as required per Table 2 (GMT Fuses).

Ampere Rating	Part Number	Fuse Color
18/100 (GMT-A)	248610301	---
1/4	248610200	VIOLET
1/2	248610300	RED
3/4	248610500	BROWN
1-1/3	248610700	WHITE
2	248610800	ORANGE
3	248610900	BLUE
5	248611000	GREEN
7-1/2	248611300	BLACK-WHITE
10	248611200	RED-WHITE
15	248611500	RED-BLUE
Replacement Safety Fuse Cover (GMT-Y)	102774	---
Replacement Dummy Fuse	248872600	---

Table 2
GMT Fuses

Replacement Alarm, Reference, and Control Fuses

Ordering Notes

1) Order replacement fuses as required per Table 3 (Replaceable Alarm, Reference, and Control Fuses).

Assembly	Desig.	Function	Size (Amperes)	Type	Part No.
Interconnect/ LVD Inhibit Circuit Card A1 (P/N 509532)	F1	Subsystem Voltage Monitoring	1-1/3	Bussmann GMT	248610700
	F2	System Voltage Monitoring	1-1/3	Bussmann GMT	248610700
	F3	Fuse Alarm	1-1/3	Bussmann GMT	248610700
	F4	LVD Side A	1-1/3	Bussmann GMT	248610700
	F5	LVD Side B	1-1/3	Bussmann GMT	248610700
	F6	Converter Fail Alarm Relays (List 71 only)	1-1/3	Bussmann GMT	248610700
	F7	Not Used	5	Bussmann GMT	248611000
	F8	Sense Voltage	1-1/3	Bussmann GMT	248610700
	F9	Battery Stand Shunt POD Circuit Card	1-1/3	Bussmann GMT	248610700
	--	--	--	Safety Fuse Cover (GMT-X)	248898700
Distribution Bus Module with TPH Fuse Block(s)	FA	Fuse Alarm	1/4	Bussmann GMT	248610200
	--	--	--	Safety Fuse Cover (GMT-X)	248898700
TPS/TLS Fuseholders (P/N 117201)	FA	Fuse Alarm	18/100	Bussmann GMT-A	248610301
	--	--	--	Safety Fuse Cover (GMT-X)	248898700
GMT Fuse Block Assembly (P/N 509128)	See "GMT Load Distribution Fuse Block Assembly Kit" under ACCESSORY DESCRIPTIONS for replaceable fuses part numbers.				

Table 3
Replaceable Alarm, Reference, and Control Fuses

TPH-Type Fuses

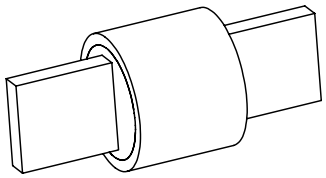
Restrictions

A bus arrangement must be specified that contains a TPH-type fuseholder.

Load should not exceed 80% of device rating.

Ordering Notes

1) Order fuses as required per Table 4 (TPH Fuses).



TPH Fuse

Ampere Rating	Part Number	for wire size and lug selection, refer to the following table
70	119437	Table 13
80	119438	
100	119440	
150	119581	
200	119582	
225	119583	
250	119584	
300	119585	
400	119586	
500	119587	
600	119588	

Table 4
TPH Fuses

GJ/218-Type Circuit Breakers

Restrictions

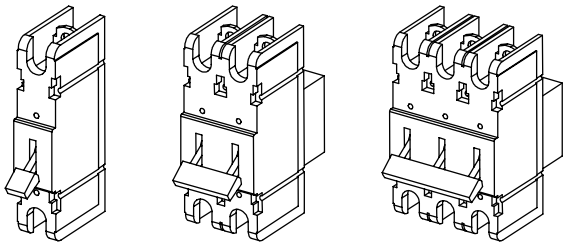
A bus arrangement must be specified that contains GJ/218-type circuit breaker positions.

Load should not exceed 80% of device rating.

Refer to Table 5 for required distribution row mounting positions.

Ordering Notes

1) Order circuit breakers as required per Table 5 (GJ/218 Circuit Breakers).
2) Order a jumper kit as required for each circuit breaker per Table 6 (Breaker Jumper Kits).



GJ/218 Circuit Breakers

Ampere Rating	Number of Positions	P/N Electrical/ Mechanical Trip[1] without Internal Shunt	P/N Electrical Trip[2] without Internal Shunt	P/N Electrical Trip[2] with Internal Shunt (25mV @ full rated load)[3]	P/N Electrical/ Mechanical Trip[1] with Internal Shunt (25mV @ full rated load)[3]	for wire size and lug selection, refer to the following table
100	1	256621700	256621300	516184	123580	Table 13
125	1	256621600	256621400	516187	123631	
150	1	256621800	256622400	516185	123632	
175	1	256621900	256622500	516186	123633	
200	1	256622200	256622600	516188	123634	
225	1	256622900	256622700	516189	123635	
250	1	256623500	256623400	516190	123636	
300	2	256625300	103572	--	--	
400	2	256626200	256626300	--	--	
600	3	256628200	103571	--	--	

[1, 2] Circuit Breaker Alarm Operation:
[1] Provides an alarm during an electrical or manual trip condition.
[2] Provides an alarm during an electrical trip condition only.

[3] Extended shunt leads are 22 AWG stranded wire, approximately 7-10 ft. long from exit point at bottom of Distribution Cabinet. Each shunt lead is equipped with a 49.9 ohm current limiting resistor.

Table 5
GJ/218 Circuit Breakers

Breaker Ampere Rating	**Distribution Bus Module List No.**	**Breaker Jumper Kit P/N** (Order 1 of the following kits for each circuit breaker W/O an internal shunt.)	**Breaker Jumper Kit P/N** (Order 1 of the following kits for each circuit breaker WITH an internal shunt.)
100A-250A	AB, AC, AD, AE, CB, CD, CE, CF, NB	503787	513731
300A, 400A	AB, CB, NB	500133	--
	AC, CD	509060	--
	AD, AE, CE, CF	513961	--
600A	AB, CB, NB	500131	--
	AC, CD	509061	--
	AD, AE, CE, CF	513957	--

Table 6
GJ/218 Circuit Breaker Jumper Kits

Bullet Nose-Type Circuit Breakers and Bullet Nose-Type Fuseholders e/w TPS/TLS Fuses

Features

- Each circuit breaker (as listed in Table 7) plugs into one, two, or three mounting position(s) on a Distribution Bus Module containing Bullet Nose-type distribution positions.
- A single fuseholder provides for installation of a 3 to 100 ampere Bussmann TPS-type or Littelfuse TLS-type fuse (as listed in Table 8). This fuseholder plugs into a single mounting position on a Distribution Bus Module containing Bullet Nose-type distribution positions. This fuseholder provides a GMT-A alarm type fuse, which operates open to provide an alarm indication if the associated distribution fuse opens.

Restrictions

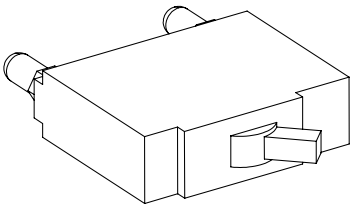
Load should not exceed 80% of device rating.

Install distribution devices from left to right, starting with the highest capacity and working to the lowest capacity.

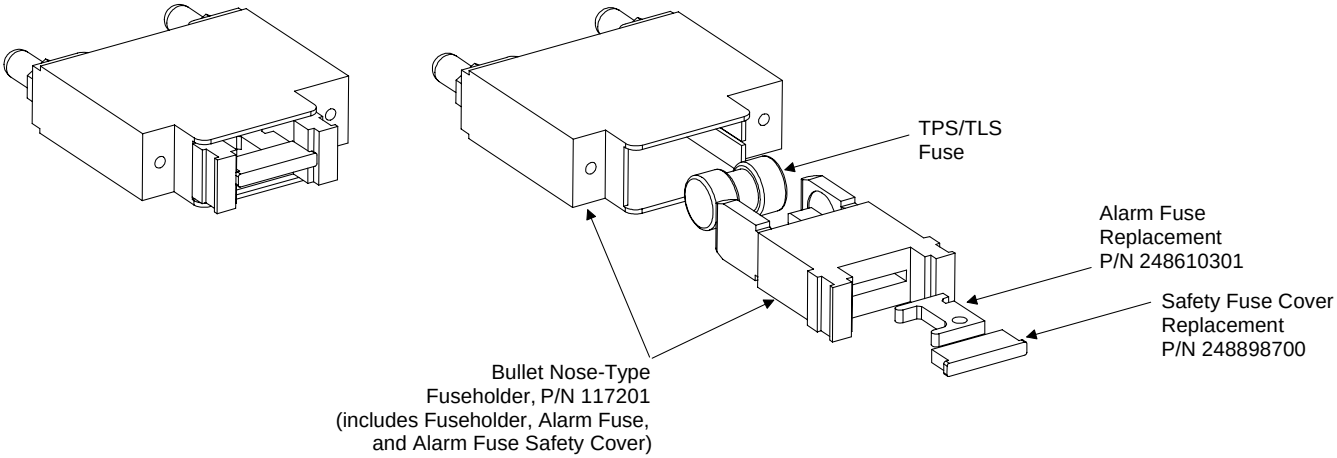
Caution: ***A circuit breaker with a rating greater than 150 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.***

Ordering Notes

1) Order circuit breakers as required per Table 7 (Bullet Nose-Type Circuit Breakers).
2) Order fuses as required per Table 8 (Bullet Nose-Type Fuseholders and TPS/TLS Fuses). For each fuse ordered, also order one (1) P/N 117201 bullet nose-type fuseholder.
3) When ordering 125A, 150A, 200A, or 250A circuit breakers, associated crimp lugs must be ordered from Table 11 (Special Application Crimp Lug / Strap Combination).



Bullet Nose-Type Circuit Breaker



Ampere Rating	Number of Poles (and Mounting Positions)	Part Number		for wire size and lug selection, refer to the following table
		Electrical Trip[1] (White Handle)	Electrical/ Mechanical Trip[2] (Black Handle)	
1	1	102272	101596	Table 12
3	1	102273	101597	
5	1	102274	101598	
10	1	102275	101599	
15	1	102276	101600	
20	1	102277	101601	
25	1	102278	101602	
30	1	102279	101603	
35	1	102280	101604	
40	1	102281	101605	
45	1	121998	121997	
50	1	102282	101606	
60	1	102283	101607	
70	1	102284	101608	
75	1	102285	101609	
80	1	121996	121995	
100	1	102286	101610	
125	2	516991	516838	
150	2	516993	516839	
200	2	121831	121832	
250	3	121835	121836	Order (1) P/N 514717 adapter kit per 250A Bullet Nose Type circuit breaker ordered. Order lugs per Table 11.

Circuit Breaker Alarm Operation:

[1] Provides an alarm during an electrical trip condition only.

[2] Provides an alarm during an electrical or manual trip condition.

Table 7
Bullet Nose-Type Circuit Breakers

Ampere Rating	Part Number	Bussmann P/N	Littelfuse P/N	for wire size and lug selection, refer to the following table
3	248230900	TPS-3	TLS003	Table 12
5	248231000	TPS-5	TLS005	
6	248231200	TPS-6	TLS006	
10	248231500	TPS-10	TLS010	
15	248231800	TPS-15	TLS015	
20	248232100	TPS-20	TLS020	
25	248232400	TPS-25	TLS025	
30	248232700	TPS-30	TLS030	
40	248233300	TPS-40	TLS040	
50	248233900	TPS-50	TLS050	
60	248234200	TPS-60	TLS060	
70	248234500	TPS-70	TLS070	
80	118413	--	TLS080	
90	118414	--	TLS090	
100	118415	--	TLS100	
Bullet Nose-Type Fuseholder		P/N 117201 (Includes Fuseholder, 18/100A GMT-A Alarm Fuse, and GMT-X Safety Fuse Cover)		

Table 8
Bullet Nose-Type Fuseholders and TPS/TLS Fuses

Wiring Components

Load Distribution Wire Sizes and Lugs Selection

Features

- **When Distribution Bus Modules Using Bullet Nose-Type Devices (TPS/TLS Fuses and/or Bullet Nose-Type Circuit Breakers) are Provided:** Lug-terminated load leads are connected to the individual load busbars located on the Distribution Bus Module and the respective distribution ground busbar.

  The individual load busbars provide 1/4-20 threaded holes for installation of customer-provided two-hole lugs that have 5/8 inch centers and 1/4 inch bolt clearance holes. Customer must provide lug mounting bolts and hardware.

  The distribution ground busbar provides 1/4-20 studs for installation of the same type of customer-provided lugs. Customer must provide lug mounting hardware.

  Refer to the illustrations under the LIST DESCRIPTIONS for a dimensional drawing.

  Maximum size of wire to be connected to a single fuseholder/circuit breaker position is 2 AWG. For wiring up to 350 kcmil, see Table 11 (Special Application Crimp Lug / Strap Combination), or see the following part numbers in ACCESSORY DESCRIPTIONS for available adapter busbars: 514717, 534449, and 514714.

- **When Distribution Bus Modules Using GJ/218 Circuit Breakers or TPH Fuses are Provided:** Lug-terminated load leads are connected to the individual load busbars located on the Distribution Bus Module and the respective distribution ground busbar.

  The individual load busbars provide 3/8-16 captive nuts for installation of customer-provided two-hole lugs that have 1 inch centers and 3/8 inch bolt clearance holes. Customer must provide lug mounting bolts and hardware.

  The distribution ground busbar provides 3/8-16 captive nuts for installation of the same type of customer-provided lugs. Customer must provide lug mounting bolts and hardware.

  Refer to the illustrations under the LIST DESCRIPTIONS for a dimensional drawing.

Restrictions

See 'Features' above.

Ordering Notes

1) The rating of the distribution device determines the load lead wire size requirement. The Distribution Bus Module ordered determines the lug hole size and spacing requirements. For wire size and lug selection; refer to the following.

   a) When Distribution Bus Modules Using Bullet Nose-Type Devices (TPS/TLS Fuses and/or Bullet Nose-Type Circuit Breakers) are Provided: The individual load busbars and associated ground busbar are designed to accommodate the lugs listed in Tables 9 and 11. Use Table 12 to select recommended load distribution wire sizes and lugs for various loop lengths per fuse/circuit breaker ampere rating.

   b) When Distribution Bus Modules Using GJ/218 Circuit Breakers or TPH Fuses are Provided: The individual load busbars and associated ground busbar are designed to accommodate the lugs listed in Table 10. Use Table 13 to select recommended load distribution wire sizes and lugs for various loop lengths per fuse/circuit breaker ampere rating.

2) For other available lugs and hardware, refer to drawings 031110100 through 031110300.

Input Battery Wire Sizes and Lugs Selection

Features

- **When Distribution Bus Modules Providing Battery Disconnect Fuse/Circuit Breaker Positions are Provided:**

  a) **When Distribution Bus Modules Using Bullet Nose-Type Devices (TPS/TLS Fuses and/or Bullet Nose-Type Circuit Breakers) are Provided:** Lug-terminated input battery leads are connected to the individual battery busbars located on the Distribution Bus Module and the respective battery return busbar.

  Battery Load Side: The individual input battery busbars provide 1/4-20 threaded holes for installation of customer-provided two-hole lugs that have 5/8 inch centers and 1/4 inch bolt clearance holes. Refer to the illustrations under the LIST DESCRIPTIONS for a dimensional drawing. Maximum size of wire to be connected to a single fuseholder/circuit breaker position is 2 AWG. For wiring up to 350 kcmil, see Table 11 (Special Application Crimp Lug / Strap Combination), or see the following part numbers in ACCESSORY DESCRIPTIONS for available adapter busbars: 514717, 534449, and 514714.

  Battery Return Side: The battery return busbar provides 3/8-16 and 1/4-20 captive nuts for installation of customer-provided two-hole lugs that have 1 or 5/8 inch centers and 3/8 or 1/4 inch bolt clearance holes, respectively. Refer to "Electrical Connection Locations and Dimensions" under PHYSICAL SIZE INFORMATION for a dimensional drawing. Customer must provide lug mounting bolts and hardware.

  b) **When Distribution Bus Modules Using GJ/218 Circuit Breakers or TPH Fuses are Provided:** Lug-terminated input battery leads are connected to the individual battery busbars located on the Distribution Bus Module and the respective battery return busbar.

  Battery Load Side: The individual input battery busbars provide 3/8-16 captive nuts for installation of customer-provided two-hole lugs that have 1 inch centers and 3/8 inch bolt clearance holes. Refer to the illustrations under the LIST DESCRIPTIONS for a dimensional drawing. Customer must provide lug mounting bolts and hardware.

  Battery Return Side: The battery return busbar provides 3/8-16 and 1/4-20 captive nuts for installation of customer-provided two-hole lugs that have 1 or 5/8 inch centers and 3/8 or 1/4 inch bolt clearance holes, respectively. Refer to "Electrical Connection Locations and Dimensions" under PHYSICAL SIZE INFORMATION for a dimensional drawing. Customer must provide lug mounting bolts and hardware.

- **When Distribution Bus Modules with Battery Disconnect Fuse/Circuit Breaker Positions are NOT Provided:** Lug-terminated input battery leads are connected to the battery busbar and battery return busbar. These busbars provide 3/8-16 and 1/4-20 captive nuts for installation of customer-provided two hole lugs that have 1 or 5/8 inch centers and 3/8 or 1/4 inch bolt clearance holes, respectively. Customer must provide lug mounting bolts and hardware. Refer to "Electrical Connection Locations and Dimensions" under PHYSICAL SIZE INFORMATION for a dimensional drawing.

Restrictions

See 'Features' above.

Ordering Notes

1) **When Distribution Bus Modules Providing Battery Disconnect Fuse/Circuit Breaker Positions are Provided:** The rating of the disconnect device determines the input battery lead wire size requirement. The Distribution Bus Module ordered determines the lug hole size and spacing requirements. For wire size and lug selection; refer to the following.

   a) **When Distribution Bus Modules Using Bullet Nose-Type Devices (TPS/TLS Fuses and/or Bullet Nose-Type Circuit Breakers) are Provided:** The individual input battery busbars and associated battery return busbar are designed to accommodate the lugs listed in Tables 9 and 11. Use Table 12

to select recommended battery wire sizes and lugs for various loop lengths per battery disconnect fuse/circuit breaker ampere rating. Table 13 may be used to select two-hole lugs with 3/8 inch bolt clearance holes and 1 inch centers for the battery return busbar.

b) When Distribution Bus Modules Using GJ/218 Circuit Breakers or TPH Fuses are Provided: The individual input battery busbars and associated battery return busbar are designed to accommodate the lugs listed in Table 10. Use Table 13 to select recommended battery wire sizes and lugs for various loop lengths per battery disconnect fuse/circuit breaker ampere rating.

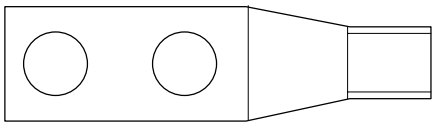
2) **When Distribution Bus Modules with Battery Disconnect Fuse/Circuit Breaker Positions are NOT Provided:** Battery wire size and lug requirements are determined by site requirements. For wire size and lug selection; refer to the following.

The battery busbars are designed to accommodate the lugs listed in Tables 9 and 10. Use Table 13 to select recommended battery wire sizes and lugs for various loop lengths per required battery branch circuit ampere rating. Table 12 may be used to select two-hole lugs with 1/4 inch bolt clearance holes and 5/8 inch centers.

Note: *Lists RA, RB, RC, RD, and RE do not provide 1/4-20 captive nuts on the battery busbar; only 3/8-16 captive nuts are furnished.*

3) For other available lugs and hardware, refer to drawings 031110100 through 031110300.

Standard Crimp Lug Tables



Lead Size	Part Number
14-10 AWG	245342300
8 AWG	245390200
6 AWG	245346700
4 AWG	245346800
2 AWG	245346900

Table 9
Crimp Lug
Two-Hole, 1/4” Bolt Clearance Hole, 5/8” Centers

Lead Size	Part Number
6 AWG	245349900
4 AWG	245350000
2 AWG	245348200
1/0 AWG	245347100
2/0 AWG	245347200
3/0 AWG	245347300
4/0 AWG	245347400
250 kcmil	245347500
300 kcmil	245347600
350 kcmil	245347700
400 kcmil	245347800
500 kcmil	245347900
600 kcmil	245348000
750 kcmil	245348100

Table 10
Crimp Lug
Two-Hole, 3/8” Bolt Clearance Hole, 1” Centers

Special Application Crimp Lug / Strap Combination Table

Features

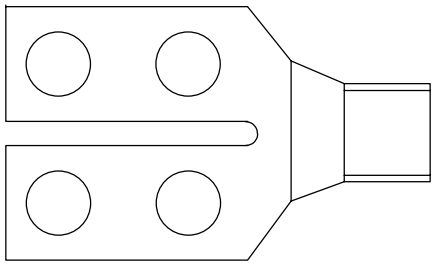
- Straps two fuseholder/circuit breaker wiring positions together, and provides a crimp-type lug which allows distribution wiring up to 350 kcmil size (maximum size of wire to be connected to a single position is 2 AWG). Designed for use with 125 ampere and larger bullet nose-type circuit breakers or TPS/TLS-type fuses, which require at least two mounting positions.

Restrictions

If used with bullet nose-type circuit breakers or TPS/TLS-type fuses smaller than 125 amperes, an empty mounting position is required adjacent to the distribution device.

Ordering Notes

1) Specify part number from Table 11 for desired lead size.



Lead Size	Part Number
1/0 AWG	245393500
2/0 AWG	245393600
3/0 AWG	245393700
4/0 AWG	245393800
250 kcmil	514872
350 kcmil	514873

Table 11
Special Application Crimp Lug / Strap Combination
(Two-Hole Lug, 1/4” Bolt Clearance Hole, 5/8” Centers)

Wire Size and Lug Selection Tables for Load and Battery Connections to TPS/TLS Fuses and Bullet Nose-Type Circuit Breakers or Battery Branch Circuits

Fuse/ Circuit Breaker Amperage	Recm 90°C Wire Size [1]							
	14 AWG	12 AWG	10 AWG	8 AWG	6 AWG	4 AWG	2 AWG	1/0 AWG
	Loop Length (feet) [2]							
1, 3, 5, 6, 10A	37 [3, 4]	58 [3, 4]	93 [3, 4]	--	--	--	--	--
15A	24 [3, 4]	39 [3, 4]	62 [3, 4]	--	--	--	--	--
20A	--	29 [3, 4]	46 [3, 4]	74 [3, 4]	--	--	--	--
25A	--	--	37 [3, 4]	59 [3, 4]	94 [3, 4]	--	--	--
30A	--	--	31 [3, 4]	49 [3, 4]	78 [3, 4]	--	--	--
35A	--	--	--	42 [3, 4]	67 [3, 4]	107 [3, 4]	--	--
40A	--	--	--	37 [3, 4]	59 [3, 4]	94 [3, 4]	--	--
45A	--	--	--	33 [3, 4]	52 [3, 4]	83 [3, 4]	--	--
50A	--	--	--	29 [3, 4]	47 [3, 4]	75 [3, 4]	--	--
60A	--	--	--	--	39 [3, 4]	62 [3, 4]	99 [3, 4]	--
70A	--	--	--	--	33 [3]	53 [3, 4]	85 [3, 4]	135 [4]
75A	--	--	--	--	31 [3]	50 [3, 4]	79 [3, 4]	126 [4]
80A	--	--	--	--	--	47 [3, 4]	74 [3, 4]	118 [3, 4]
Recommended Crimp Lug [5]								
Lug	245342300	245342300	245342300	245390200	245346700	245346800	245346900	245393500 [6]

1 Wire sizes based on recommendations of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC). Table 310-16 for copper wire at **90°C** conductor temperature operating in ambients of **30°C** and **40°C** was used. For other operating ambient temperatures, refer to the NEC. For operation in countries where the NEC is not recognized, follow applicable codes.

2 Recommended wire sizes are sufficient to restrict voltage drop to 1.0 volt or less at listed branch current for the loop lengths shown. Loop length is the sum of the lengths of the positive and negative leads.

3 Wire Size / Loop Length Combination Calculated using 30°C Ambient Operating Temperature.

4 Wire Size / Loop Length Combination Calculated using 40°C Ambient Operating Temperature.

5 Two-hole lug, 1/4" bolt clearance hole, 5/8" centers. Refer to drawing 031110100 for lug crimping information.

6 Special application crimp lug / strap combination.

Table 12 (cont'd on next page)
Recommended Wire Sizes and Lugs for Load and Battery Connections
to Various **TPS/TLS Fuses** and **Bullet Nose-Type Circuit Breakers**
or **Battery Branch Circuits**

Fuse/ Circuit Breaker Amperage	Recm 90°C Wire Size [1]							
	4 AWG	2 AWG	1/0 AWG	2/0 AWG	3/0 AWG	4/0 AWG	250 kcmil	350 kcmil
	Loop Length (feet) [2]							
90A	41 [3]	66 [3, 4]	105 [3, 4]	133 [4]	--	--	--	--
100A	--	59 [3, 4]	95 [3, 4]	119 [3, 4]	--	--	--	--
125A	--	47 [3]	76 [3, 4]	95 [3, 4]	120 [4]	--	--	--
150A	--	--	63 [3, 4]	79 [3, 4]	100 [3, 4]	--	--	--
200A	--	--	--	--	75 [3, 4]	95 [3, 4]	112 [3, 4]	--
250A	--	--	--	--	--	76 [3, 4, 7]	90 [3, 4, 7]	126 [3, 4, 7]
Recommended Crimp Lug								
Lug [5]	245346800	245346900	245393500 [6]	245393600 [6]	245393700 [6]	245393800 [6]	514872 [6]	514873 [6]
Lug [8, 9]	--	245348200	245347100	245347200	245347300	245347400	245347500	245347700

1 Wire sizes based on recommendations of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC). Table 310-16 for copper wire at **90°C** conductor temperature operating in ambients of **30°C** and **40°C** was used. For other operating ambient temperatures, refer to the NEC. For operation in countries where the NEC is not recognized, follow applicable codes.

2 Recommended wire sizes are sufficient to restrict voltage drop to 1.0 volt or less at listed branch current for the loop lengths shown. Loop length is the sum of the lengths of the positive and negative leads.

3 Wire Size / Loop Length Combination Calculated using 30°C Ambient Operating Temperature.

4 Wire Size / Loop Length Combination Calculated using 40°C Ambient Operating Temperature.

5 Two-hole lug, 1/4" bolt clearance hole, 5/8" centers. Refer to drawing 031110100 for lug crimping information.

6 Special application crimp lug / strap combination.

7 **MUST USE** P/N 514717 Lug Adapter Busbar for lugs having 1/4" bolt clearance hole, 5/8" centers.

8 Two-hole lug, 3/8" bolt clearance hole, 1" centers. Refer to drawing 031110100 for lug crimping information.

9 **MUST USE** P/N 534449 Lug Adapter Busbar Kit for 125-200A circuit breakers or P/N 514714 Lug Adapter Busbar Kit for 250A circuit breakers.

Table 12 (cont'd from previous page)
Recommended Wire Sizes and Lugs for Load and Battery Connections
to Various **TPS/TLS Fuses** and **Bullet Nose-Type Circuit Breakers**
or **Battery Branch Circuits**

Wire Size and Lug Selection Tables for Load and Battery Connections to TPH Fuses and GJ/218-Type Circuit Breakers or Battery Branch Circuits

Fuse/ Circuit Breaker Amperage	Recm 90°C Wire Size [1]							
	6 AWG	4 AWG	2 AWG	1/0 AWG	2/0 AWG	3/0 AWG	4/0 AWG	250 kcmil
	Loop Length (feet) [2]							
70A	33 [3]	53 [3, 4]	85 [3, 4]	135 [4]	--	--	--	--
80A	--	47 [3, 4]	74 [3, 4]	118 [3, 4]	--	--	--	--
100A	--	--	59 [3, 4]	95 [3, 4]	119 [3, 4]	--	--	--
125A	--	--	47 [3]	76 [3, 4]	95 [3, 4]	120 [4]	--	--
150A	--	--	--	63 [3, 4]	79 [3, 4]	100 [3, 4]	--	--
175A	--	--	--	--	68 [3, 4]	86 [3, 4]	108 [3, 4]	--
200A	--	--	--	--	--	75 [3, 4]	95 [3, 4]	112 [3, 4]
Recommended Crimp Lug [5]								
Lug	245349900	245350000	245348200	245347100	245347200	245347300	245347400	245347500

1 Wire sizes based on recommendations of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC). Table 310-16 for copper wire at **90°C** conductor temperature operating in ambients of **30°C** and **40°C** was used. For other operating ambient temperatures, refer to the NEC. For operation in countries where the NEC is not recognized, follow applicable codes.

2 Recommended wire sizes are sufficient to restrict voltage drop to 1.0 volt or less at listed branch current for the loop lengths shown. Loop length is the sum of the lengths of the positive and negative leads.

3 Wire Size / Loop Length Combination Calculated using 30°C Ambient Operating Temperature.

4 Wire Size / Loop Length Combination Calculated using 40°C Ambient Operating Temperature.

5 Two-hole lug, 3/8" bolt clearance hole, 1" centers. Refer to drawing 031110100 for lug crimping information.

Table 13 (cont'd on next page)
Recommended Wire Sizes and Lugs for Load and Battery Connections
to Various **TPH Fuses** and **GJ/218-Circuit Breakers**
or **Battery Branch Circuits**

Fuse/ Circuit Breaker Amperage	Recm 90°C Wire Size [1]							
	2/0 AWG	**3/0 AWG**	**4/0 AWG**	**250 kcmil**	**300 kcmil**	**350 kcmil**	**400 kcmil**	**500 kcmil**
	Loop Length (feet) [2]							
225A	--	67 [3]	84 [3, 4]	100 [3, 4]	120 [4]	--	--	--
250A	--	--	76 [3]	90 [3, 4]	108 [3, 4]	126 [4]	--	--
300A	159 [4] (2) Wires	--	--	--	90 [3]	105 [3, 4]	120 [3, 4]	--
400A	--	75 [3, 4] (2) Wires	95 [3, 4] (2) Wires	112 [3, 4] (2) Wires	--	--	--	--
500A	--	--	76 [3] (2) Wires	90 [3, 4] (2) Wires	108 [3, 4] (2) Wires	126 [4] (2) Wires	--	--
600A	--	--	--	--	90 [3] (2) Wires	105 [3, 4] (2) Wires 157 [4] (3) Wires	120 [3, 4] (2) Wires	--
Recommended Crimp Lug [5]								
Lug	245347200 (per cable)	245347300 (per cable)	245347400 (per cable)	245347500 (per cable)	245347600 (per cable)	245347700 (per cable)	245347800 (per cable)	245347900 (per cable)

1 Wire sizes based on recommendations of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC). Table 310-16 for copper wire at **90°C** conductor temperature operating in ambients of **30°C** and **40°C** was used. For other operating ambient temperatures, refer to the NEC. For operation in countries where the NEC is not recognized, follow applicable codes.

2 Recommended wire sizes are sufficient to restrict voltage drop to 1.0 volt or less at listed branch current for the loop lengths shown. Loop length is the sum of the lengths of the positive and negative leads.

3 Wire Size / Loop Length Combination Calculated using 30°C Ambient Operating Temperature.

4 Wire Size / Loop Length Combination Calculated using 40°C Ambient Operating Temperature.

5 Two-hole lug, 3/8" bolt clearance hole, 1" centers. Refer to drawing 031110100 for lug crimping information.

Table 13 (cont'd from previous page)
Recommended Wire Sizes and Lugs for Load and Battery Connections
to Various **TPH Fuses** and **GJ/218-Circuit Breakers**
or **Battery Branch Circuits**

AC Input Branch Circuit Protection and Wire Size Selection

Refer to PD588705100/PD588705101/PD588705102/PD588705103/PD588705104.

Relay Rack Frame Grounding Requirements

Ordering Notes

1) For relay rack grounding requirements, refer to the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NPFA) National Electrical Code (NEC), applicable local codes, and your specific site requirements.

   A customer's grounding network lead can be attached to the top of each relay rack. Provision is made for installing a lead with a two-hole lug that has 1/4" bolt clearance holes on 5/8" centers. Refer to Table 9 for lug selection.

External Alarm, Reference, and Control Wire Sizes

Features

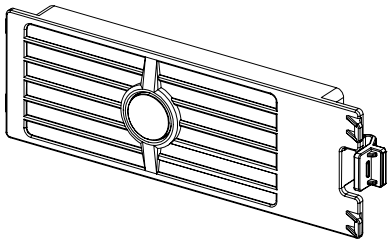
- External alarm, reference, and control connection points are located on…
  - J1-J4 on the optional List 71 Audible Alarm and Alarm Termination Circuit Card P/N 509539,
  - TB1 on circuit card P/N 509532, and
  - J8 on circuit card P/N 534868 (if List 71 not installed).
- See "Electrical Connections Locations and Dimensions; External Alarm, Reference, and Control" under PHYSICAL SIZE INFORMATION for illustration.

J1-J4 on Optional List 71 Audible Alarm and Alarm Termination Circuit Card P/N 509539		
Terminals		**Recm Wire Size**
Capacity	**Type**	
26 to 16 AWG	Spring-Clamp	22 AWG for Loop Lengths Up to 200 ft. 18-20 AWG for Loop Lengths Over 200 ft.

TB1 on Circuit Card P/N 509532		
Terminals		**Recm Wire Size**
Capacity	**Type**	
26 to 16 AWG	Spring-Clamp	22 AWG for Loop Lengths Up to 200 ft. 18-20 AWG for Loop Lengths Over 200 ft.

J8 on Circuit Card P/N 534868	
Terminals	**Recm Wire Size**
D-Type Connector	22 AWG for Loop Lengths Up to 200 ft. 18-20 AWG for Loop Lengths Over 200 ft.

Module Mounting Position Blank Cover Panel (P/N 540959)



Features

- Covers one (1) unused module mounting position.

Ordering Notes

1) Order a Module Mounting Position Blank Cover Panel, P/N 540959, for each empty module mounting position in the system.

Battery Charge Temperature Compensation Probe for Single Probe Digital Compensation (P/Ns 107021 and 106824)

Features

- This system can be used with a Battery Charge Temperature Compensation Probe. This probe must be mounted near the battery to sense battery ambient temperature. The probe connects to and allows the MCA to automatically increase or decrease the output voltage of the system to maintain battery float current as battery ambient temperature decreases or increases, respectively. Battery life can be extended when an optimum charge voltage to the battery with respect to temperature is maintained. Two probes are available. P/N 107021 has a 25-foot long cord. P/N 106824 has a 100 foot-long cord. See "Overall Dimensions, Optional Digital Battery Charge Temperature Compensation Probe (P/N 107021 and 106824)" under PHYSICAL SIZE INFORMATION for a dimensional drawing. Refer to PD588705100/PD588705101/PD588705102/PD588705103/PD588705104 for complete specifications.

Ordering Notes

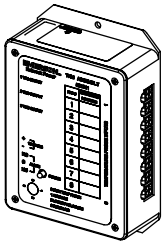
1) Order one Battery Charge Temperature Compensation Probe per power system, as required.

Battery Charge Temperature Compensation Probe Concentrator for Multiple Probe Use (TXM)

Battery Temperature Probe Concentrator Kit (P/N 524570)

Features

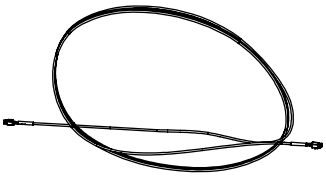
- The Battery Temperature Probe Concentrator (TXM) expands battery temperature monitoring capabilities by providing a means of monitoring up to eight (8) analog battery temperature probes. The TXM provides a digital output for connection to the MCA battery temperature probe connector. The MCA can be programmed to compensate for the hottest probe reading, the average temperature of all connected probes, or the probe connected to the lowest numbered connector. The kit includes one TXM (P/N 521211) and one 25 ft. interface cable (P/N 521228) for connecting the TXM to the MCA.



521211

Restrictions

Requires P/N 521262 analog probes. **Cannot** be used with digital probes (P/N 106824 and 107021).



521228

Ordering Notes

1) Order one Battery Charge Temperature Compensation Probe Concentrator Kit (P/N 524570) per power system, and up to eight P/N 521262 probes, as required. Order extension cable P/N 514153 as required.

Analog Battery Temperature Probe (P/N 521262)

Features

- An analog probe designed to sense internal battery temperature. Mounts on the negative terminal of the battery; mounting hole clears 5/16" hardware. Includes 15 ft. cable with connector. See "Overall Dimensions, Optional Analog Battery Temperature Probe (P/N 521262)" under PHYSICAL SIZE INFORMATION for a dimensional drawing.

Ordering Notes

1) See above Ordering Notes.

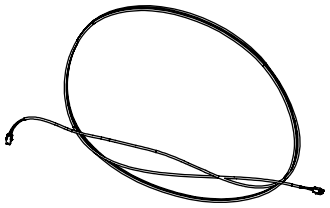
TXM Extension Cable (P/N 514153)

Features

- 25 ft. long cable. Can be used between a P/N 521262 Analog Battery Temperature Probe and the TXM; or to extend a P/N 521228 interface cable between the TXM and MCA.

Ordering Notes

1) See above Ordering Notes.

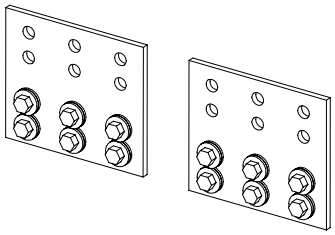


514153

Battery Busbar Extension Kit (P/N 514713)

Features

- Provides busbar extension plates and mounting hardware for extending battery busbars through the top of a Distribution Cabinet. Each busbar extension plate provides three pairs of clearance holes for 3/8" hardware on 1" centers. Allows back-to-back lug landing for up to six lugs per polarity. See "Electrical Connection Locations and Dimensions, Input Battery (Connections to Optional Battery Busbar Extension Kit P/N 514713 Installed in Lists 21 through 24 Distribution Cabinets)" under PHYSICAL SIZE INFORMATION for a dimensional drawing.



Restrictions

Required for cable connections between 1200A and 2000A per bay when inter-bay busbars are not provided.

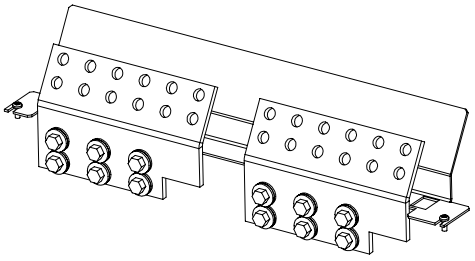
Ordering Notes

1) Order one (1) kit P/N 514713 per bay that busbars are to be extended, as required.

Battery Busbar Extension Kit (P/N 529143)

Features

- Provides busbar extension plates, mounting hardware, and rear plastic cover for extending battery busbars through the top of a Distribution Cabinet. Each busbar extension plate provides six pairs of clearance holes for 3/8" hardware on 1" centers. Allows back-to-back lug landing for up to twelve lugs per polarity. See "Electrical Connection Locations and Dimensions, Input Battery (Connections to Optional Battery Busbar Extension Kit P/N 529143 Installed in Lists 21 through 24 Distribution Cabinets)" under PHYSICAL SIZE INFORMATION for a dimensional drawing.



Restrictions

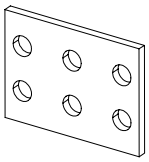
Required for cable connections between 1200A and 2000A per bay when inter-bay busbars are not provided.

Ordering Notes

1) Order one (1) kit P/N 529143 per bay that busbars are to be extended, as required.

Lug Adapter Busbar for 250 Amp Bullet Nose Type Circuit Breaker (P/N 514717)

Features



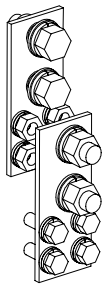
- Provides a busbar that mounts on the three lug landing positions of a 250A bullet nose circuit breaker, and provides a landing for a Special Application Crimp Lug / Strap Combination, which accepts required wire size.

Ordering Notes

1) Order one (1) P/N 514717 per 250A Bullet Nose circuit breaker ordered.

Lug Adapter Busbar Kit for 125-200 Amp Bullet Nose Type Circuit Breaker (P/N 534449)

Features



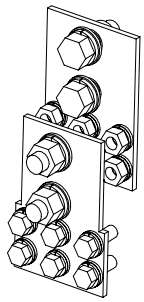
Includes one (1) busbar that mounts on the two lug landing positions of a 125-200A bullet nose circuit breaker, and provides a landing for one standard two-hole lug having 3/8" bolt clearance holes on 1" centers. Also includes one (1) busbar that mounts on two landings of the system ground return bar, and provides one landing for a standard two-hole lug having 3/8" bolt clearance Holes on 1" centers. All busbar and lug mounting hardware is included.

Ordering Notes

1) Order (1) Part No. 534449 per 125-200A Bullet Nose circuit breaker ordered.

Lug Adapter Busbar Kit for 250 Amp Bullet Nose Type Circuit Breaker (P/N 514714)

Features



Includes one (1) busbar that mounts on the three lug landing positions of a 250A bullet nose circuit breaker, and provides one landing for a standard two-hole lug having 3/8" bolt clearance holes on 1" centers. Also includes one (1) busbar that mounts on three landings of the system ground return bar, and provides one landing for a standard two-hole lug having 3/8" bolt clearance Holes on 1" centers. All busbar and lug mounting hardware is included.

Ordering Notes

1) Order (1) Part No. 514714 per 250A Bullet Nose circuit breaker ordered.

Bullet Distribution Assembly Lug Hardware Kit (P/N 520332)

Features

- Kit provides all hardware required to connect load and ground lugs for four (4) positions of a bullet nose-type distribution assembly. Kit includes (8) 1/4-20 x 3/4" Bolt, (8) 1/4-20 Nut, (16) 1/4" Flat Washer, (16) 1/4" Lock Washer.

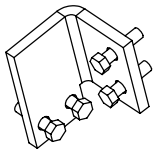
Ordering Notes

1) Order Kit P/N 520332, as required.

LVD Contactor Bypass Kits (P/Ns 514910 and 514912)

Features

- Designed for field installation in a bullet nose type distribution bus assembly where the LVD function is no longer required. Each kit provides a busbar designed to bypass one (1) low voltage disconnect contactor in a List BA, CA, GB, LB, or LC.

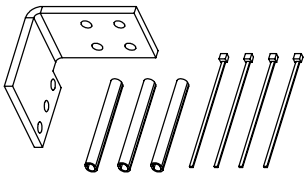


Kit P/N 514910

Restrictions

Kit P/N 514910 **may be** installed with **power applied** to system.

Kit P/N 514912 **must be** installed with **power removed** from system.



Kit P/N 514912

Ordering Notes

1) To **bypass** a contactor without removing it, order one (1) P/N 514910 kit (may be installed with power applied to system). Includes hardware.

2) To **replace** a contactor with busbar, order one (1) P/N 514912 kit (must be installed with power removed from system). Includes hardware.

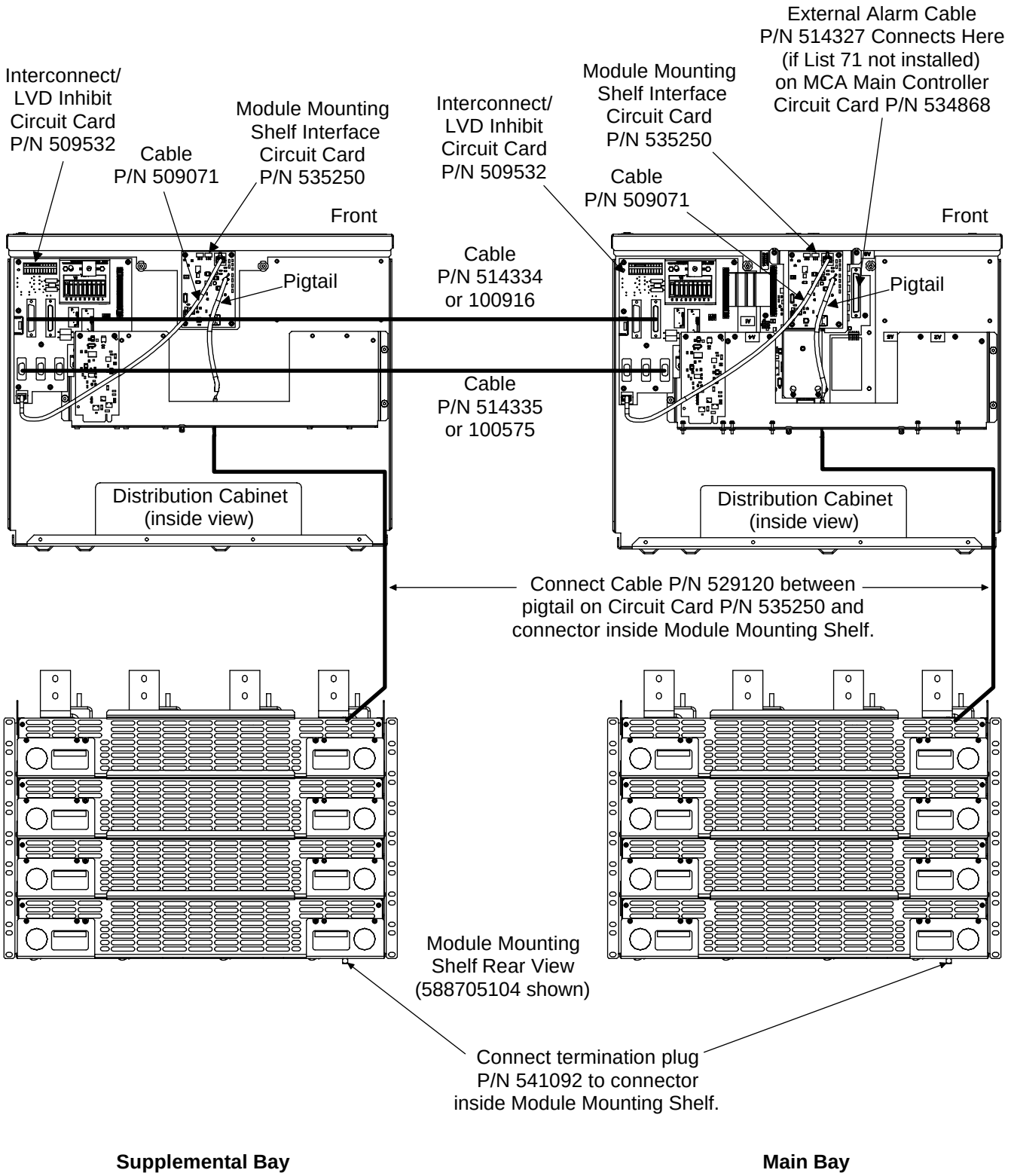
Replacement Cables

Ordering Notes

1) Refer to the following table and illustration.

Item	Part Number / Description
Standard External Alarm Interconnect Cable (cannot be used with List 71):	One 15 ft. cable is provided with List 1. For a replacement cable, order **P/N 514327**. Also available is **P/N 514380** (60 ft. cable). Provides pre-assembled cable and mating connector for connecting the MCA external alarm connector to customer circuits. Connects to J8 on the MCA Main Controller circuit card P/N 534868 located in the Main Bay Distribution Cabinet, and provides unterminated 28 AWG leads for splicing to customer leads.
Bay Module Mounting Shelf Interface Circuit Card to MCA Interconnect Cable:	**P/N 509071** Provides pre-assembled cable and mating connectors for connecting the Bay Module Mounting Shelf Interface circuit card to the MCA (via the “Interconnect/Inhibit” circuit card). Connects between the Module Mounting Shelf Interface circuit card P/N 535250 located in the Bay Distribution Cabinet and the “Interconnect/Inhibit” circuit card located in the same Distribution Cabinet.
Bay Internal 'Rectifier Module Control' Interconnect Cable:	**P/N 529120** Provides pre-assembled cable and mating connectors for connecting the Bay Module Mounting Shelf Interface circuit card to the top most Module Mounting Shelf. Connects between the pigtail located on Module Mounting Shelf Interface circuit card P/N 535250 located in the Bay Distribution Cabinet and the connector exiting the top of the topmost Module Mounting Shelf. Note that subsequent Module Mounting Shelves located within the same bay are interconnected via the shelf internal wiring harness. Connect the mating connector of the cable exiting the bottom of one Module Mounting Shelf with the connector exiting the top of the shelf installed below it.
Bay-to-Bay 'Distribution Control' Interconnect Cable:	A 6 ft. cable is provided with List 2. For a replacement cable, order **P/N 514334**. A 25 ft. cable is provided with List 5. For a replacement cable, order **P/N 100916**. Provides pre-assembled cable and mating connectors for connecting the alarm, reference, and control leads of the Supplemental Bay distribution to those of the Main Bay distribution (and to the MCA). Connects between J1 on “Interconnect/Inhibit” circuit card 509532 located within the Main Bay Distribution Cabinet and J2 on “Interconnect/Inhibit” circuit card 509532 located within the Supplemental Bay Distribution Cabinet.

Item	Part Number / Description
Bay-to-Bay 'Rectifier Module Control' Interconnect Cable:	A 7-1/2 ft. cable is provided with List 2. For a replacement cable, order **P/N 514335**. A 25 ft. cable is provided with List 5. For a replacement cable, order **P/N 100575**. Provides pre-assembled cable and mating connectors for Rectifier Module control signal interconnection between the MCA (in the Main Bay) and Module Mounting Shelves located in the Supplemental Bay. Connects between J8, J9, or J10 on "Interconnect/Inhibit" circuit card 509532 located in the Main Bay Distribution Cabinet and J8, J9, or J10 on "Interconnect/Inhibit" circuit card 509532 located in the Supplemental Bay Distribution Cabinet.
MCA Control Bus Termination Plug	Provided with each Module Mounting Shelf (List 30). For a replacement termination plug, order **P/N 541092**.



Replacement Cable Diagram

Replacement Components

Ordering Notes

1) Refer to the following table. Refer also to "Replacement Components" in PD588705100/PD588705101/PD588705102/PD588705103/PD588705104.

Item	Part Number
Rectifier Module (PCU):	Order via List 50.
DC-DC Converter Module	Order via List 62.
MCA MCA Main Controller Circuit Card: MCA Keypad/Display Circuit Card: MCA Power Supply Circuit Card:	 534868 with 534876 Configuration (List 10 Standard Configuration) 534868 with 534877 Configuration (List 11 Special Application Configuration) 534868 with 534878 Configuration (List 12 Special Application Configuration) 534868 with 534879 Configuration (List 13 Special Application Configuration.) 288710900 514361
Rectifier Shelf Interface Circuit Card:	535250
MCA Interface Circuit Cards:	Order via Lists 72, 74, 75, 76, 77, 78
Audible Alarm and Alarm Termination Circuit Card	Order via List 71
Quad Low Voltage Disconnect Circuit Card	509477
Interconnect/LVD Inhibit Circuit Card	509532
Quad Shunt POD Circuit Card	507431
Bypass Circuit Card (required for unused Quad LVD circuit card and Quad Shunt POD circuit card mounting positions)	513737
Shunt POD Circuit Card (List RD and RE Battery Disconnect Assembly with Shunt)	501981

SPECIFICATIONS

Note: *For Rectifier Shelf, Rectifier Module, and DC-DC Converter Module specifications; refer to PD588705100/PD588705101/PD588705102/PD588705103/PD588705104.*

For List 92 Battery Stand System specifications, refer to System Application Guide 588810000, furnished with the Battery Stand.

1.1 Environmental Ratings

1.1.1 Operating Ambient Temperature Range: -40°C to +40°C (-40°F to +104°F).

1.1.2 Storage Ambient Temperature Range: -40°C to +85°C (-40°F to +185°F).

1.1.3 Humidity: This Power System is capable of operating in an ambient relative humidity range of 0% to 95%, non-condensing.

1.1.4 Altitude: see PD588705100/PD588705101/PD588705102/PD588705103/PD588705104.

1.1.5 Mounting: This equipment is intended only for installation in a Restricted Access Location on or above a non-combustible surface. Clearance requirements are:

(A) Recommended minimum aisle space clearance for the front of each bay is 2' 6".

(B) Recommended minimum aisle space clearance for the rear of each bay is 2' 0" for any of the following conditions:

1. Multiple bay arrangements that incorporate rear inter-bay busbars (List 2 bays).
2. Any bay equipped with a List RC, RD or RE battery disconnect option.
3. Making AC input connections to Spec. Nos. 588705100, 588705101, 588705102, 588705103, and 588705104 Module Mounting Assemblies.
4. Addition of a Module Mounting Assembly in the field.

For all other conditions, required minimum spacing from the rear of the bay to a wall or other solid surface is that which is specified for proper Module Mounting Assembly ventilation. Refer to the specific Module Mounting Assembly Power Data Sheet for ventilation spacing requirements. ***Note:*** *Minimum spacing specified for ventilation may not permit replacement of certain components such as busbars or Module Mounting Assemblies.*

1.2 Compliance Information

1.2.1 Safety Compliance: This power board is UL Listed ("c UL") as a DC Power Distribution Center for Communications Equipment. This unit meets the requirements of CSA 22.2, No. 225 and is tested and Certified by UL ("c UL") as a Custom Built Power Distribution Center for Communications Equipment.

1.2.2 NEBS Compliance: Compliance verified by a Nationally Recognized Testing Laboratory (NRTL) per GR-1089-CORE and GR-63-CORE. Contact Emerson Network Power for NEBS compliance reports.

In order to remain compliant during a fan failure condition, the backup battery connection must be utilized to provide sufficient power to the loads for up to eight (8) hours when the system is operated at greater than 50% output power. If no backup battery connection is used, the system must operate with a redundant module installed.

1.3 MCA Features

1.3.1 MCA Interface: You can operate the MCA locally via the front panel accessed interface pad, or remotely via the WinLink option or WEB Pages. The following Interface Options are available for use with WinLink: Modem, RS-232/Modem, and Ethernet. The following Interface Options are available for use with WEB Pages: Ethernet.

Note: *Only one interface (Modem, Combination Modem/RS-232, or Ethernet) can be installed on the MCA.*

Note: *Wiring options are provided to lockout changing Power System adjustment/configuration/ calibration settings locally and/or remotely.*

In addition, the Ethernet Interface Option provides a Web-Browser Interface. The following software options are also available.

SNMP Interface: Provides an Ethernet port for MCA connection into a TCP/IP network and support for SNMP V2 (Simple Network Management Protocol). Communications to and from the MCA is accomplished via a MIB (Management Information Browser). SNMP Traps are provided for alarms listed on the MCA Menu Tree under the "Alarms Menu".

Battery Monitoring: Provides Battery Monitoring via the Web Browser Interface.

1.3.2 Remote On/Off (TR): The operation of any or all Rectifier Modules (PCUs) can be inhibited (TR) via the WinLink option, the Ethernet option, or from the MCA front panel accessed interface pad.

1.3.3 MCA Local Display: Provides digital metering of system load voltage and current, individual Rectifier Module (PCU) current, subsystem load voltage and current (if subsystem installed), and load current of subsystem, system, and/or battery shunts. Also displays system alarm messages and adjustment information, as detailed in Section 1.3.10 "MCA Display".

The MCA contains a "Power Down" mode. The MCA turns off its display and PCU communications to conserve power when system voltage falls below 20 volts. Full operation is restored when system voltage recovers to 23.5 volts. The display and communications can be temporarily reactivated by the user.

1.3.4 MCA Meter Accuracy: ±0.01 V, ±0.005% / °C

1.3.5 MCA Universal Adjustment Circuit: Provides single point control of float output voltage, test/equalize output voltage, high voltage shutdown, and current limit adjustments.

Note: *If the MCA should fail, the Rectifier Modules remember the float and high voltage shutdown settings last delivered by the MCA. The current limit setting of each Rectifier Module goes to 100% of full load rating.*

Provides adjustments for all MCA alarm and control circuits. Adjustment ranges and factory settings as follows.

All adjustments can be performed locally via the MCA front panel accessed interface pad, and most can be performed remotely via the WinLink option or the Ethernet (Web-Browser Interface) option.

(A) Rectifier Module Output Voltage:

(1) Without Battery Charge Temperature Compensation: Float voltage is adjustable from 23.50 to 28.50 volts DC. Test/equalize voltage is adjustable from 23.00 to 28.50 volts DC. The output voltage temperature coefficient does not exceed 0.01% per degree centigrade from -40°C to +65°C. Factory set as follows unless otherwise specified.

Power System List No.	**10**	**11**	**12**	**13**
MCA Configuration No.	**534876**	**534877**	**534878**	**534879**
Factory Setting (Volts)	27.24	27.00	27.24	27.24

(2) With Battery Charge Digital Temperature Compensation Probe or TXM (multiple probe concentrator module): With an optional battery charge digital temperature compensation probe or TXM installed, the MCA automatically increases or decreases the output voltage as battery ambient temperature decreases or increases, respectively. The float and test/equalize voltage range is the same as without battery charge digital

temperature compensation. Float voltage is factory set as follows at 25°C battery ambient.

Power System List No.	10	11	12	13
MCA Configuration No.	**534876**	**534877**	**534878**	**534879**
Factory Setting (Volts)	27.24	27.00	27.24	27.24

Using battery and equipment manufacturers' recommendations, the user selects the following temperature compensation curve parameters via the MCA. Refer to the Temperature Compensation Probe Curve provided in PD588705100/PD588705101/PD588705102/PD588705103/PD588705104.

a) The temperature compensation slope in volts/°C. Adjustable from zero to 100 millivolts/°C. Factory set at 0V/°C (DIGITAL TC OFF).

b) The maximum voltage limit in volts DC. Adjustable from float up to 29.25 volts DC, but automatically limited to 0.5 volt below the High Voltage Shutdown setting. Factory set as follows.

Power System List No.	10	11	12	13
MCA Configuration No.	**534876**	**534877**	**534878**	**534879**
Factory Setting (Volts)	28.25	28.25	28.25	28.25

c) The minimum voltage limit in volts DC. Adjustable from float down to 23 volts DC, but automatically limited to 0.5 volt above the Low Voltage Disconnect Reconnect setting. Factory set as follows.

Power System List No.	10	11	12	13
MCA Configuration No.	**534876**	**534877**	**534878**	**534879**
Factory Setting (Volts)	25.00	25.50	25.00	25.00

(B) Rectifier Module Current Limit: Adjustable from 10% to 120% of total system capacity at maximum rated output voltage. Factory set at 100% of rated full load, unless otherwise specified.

(C) Rectifier Module High Voltage Shutdown: Adjustable from 24.00 to 29.75 volts DC. Factory set as follows, unless otherwise specified.

Power System List No.	10	11	12	13
MCA Configuration No.	**534876**	**534877**	**534878**	**534879**
Factory Setting (Volts)	28.75	28.50	28.75	28.75

(D) High Voltage Alarm 1: Adjustable from 24.00 to 29.50 volts DC. Factory set as follows, unless otherwise specified.

Power System List No.	10	11	12	13
MCA Configuration No.	**534876**	**534877**	**534878**	**534879**
Factory Setting (Volts)	27.75	28.10	27.75	27.75

(E) High Voltage Alarm 2: Adjustable from 24.00 to 29.50 volts DC. Factory set as follows, unless otherwise specified.

Power System List No.	10	11	12	13
MCA Configuration No.	**534876**	**534877**	**534878**	**534879**
Factory Setting (Volts)	28.25	28.50	28.25	28.25

(F) Battery On Discharge Alarm: Adjustable from 20.00 to 28.00 volts DC. Factory set as follows, unless otherwise specified.

Power System List No.	10	11	12	13
MCA Configuration No.	**534876**	**534877**	**534878**	**534879**
Factory Setting (Volts)	24.00	23.50	24.00	24.00

(G) 50% Battery On Discharge (Very Low Voltage) Alarm: Adjustable from 20.00 to 28.00 volts DC. Factory set per table below, unless otherwise specified.

Power System List No.	10	11	12	13
MCA Configuration No.	**534876**	**534877**	**534878**	**534879**
Factory Setting (Volts)	23.00	22.00	23.00	23.00

(H) System Load Current Alarm: Adjustable from 0 to 60,000 amperes. Factory set at 2,000 amperes, unless otherwise specified.

(I) Subsystem High Voltage Alarm (if subsystem installed): Adjustable from 0.00 to 60.00 volts DC. Factory set as follows, unless otherwise specified.

Power System List No.	10	11	12	13
MCA Configuration No.	**534876**	**534877**	**534878**	**534879**
Factory Setting (Volts)	50.00	53.00	50.00	50.00

(J) Subsystem Low Voltage Alarm (if subsystem installed): Adjustable from 0.00 to 60.00 volts DC. Factory set as follows, unless otherwise specified.

Power System List No.	10	11	12	13
MCA Configuration No.	**534876**	**534877**	**534878**	**534879**
Factory Setting (Volts)	46.00	44.50	46.00	46.00

(K) Subsystem Load Current Alarm (if subsystem installed): Adjustable from 0 to 60000 ampere. Factory set at 2000 amperes, unless otherwise specified.

(L) High Battery Ambient Temperature Alarm (if battery charge digital temperature compensation probe or TXM installed): Adjustable from -50°C to +99°C. Factory set to off, unless otherwise specified. (If TXM installed, each temperature probe has an associated alarm.)

(M) Low Battery Ambient Temperature Alarm (if battery charge digital temperature compensation probe or TXM installed): Adjustable from -49°C to +100°C. Factory set to off, unless otherwise specified. (If TXM installed, each temperature probe has an associated alarm.)

(N) Low Voltage Disconnect (if LVD installed): Low voltage disconnect is adjustable from 20.0 to 25.0 volts DC. Reconnect is adjustable from 23.5 to 28.5 volts DC. The factory disconnect and reconnect settings are as follows, unless otherwise specified.

Power System List No.	10	11	12	13
MCA Configuration No.	534876	534877	534878	534879
Factory Disconnect Setting (Volts)	21.0	21.7	21.0	21.0
Factory Reconnect Setting (Volts)	24.5	25.2	24.5	24.5

(O) Audible Alarm Cutoff Reset Feature: Adjustable from 0 to 15 minutes, in one minute intervals. A zero setting disables the feature. Factory set at 15 minutes, unless otherwise specified.

(P) Timed Test/Equalize Period (also enables/disables the manually initiated timed test/equalize feature): Adjustable from 1 to 99 hours, in one hour intervals. When a value is set, the feature is enabled. You disable the feature by selecting the setting above 99. Factory set at 1 (one) hour, unless otherwise specified.

(Q) Automatic Test/Equalize Period (also enables/disables the automatic test/equalize feature): Adjustable from 0 to 15 times the discharge time period, up to a maximum of 300 hours. A zero (0) setting disables the feature. Factory set at zero (0), unless otherwise specified.

(R) Relay Test Seconds: Adjustable from 5 to 120 seconds, in one second intervals. Factory set at 45 seconds, unless otherwise specified.

1.3.6 MCA Audible Alarm Cutoff (List 10 and List 11 MCA only): An audible alarm can be connected to the MCA that sounds when any alarm condition monitored by the MCA occurs. The alarm can be manually silenced (cut off) by pressing a local pushbutton. A local indicator illuminates when the audible alarm has been cut off. The alarm remains silenced for the current alarm condition only. If another alarm condition occurs, the audible alarm again sounds.

A programmable audible alarm cutoff reset feature is provided. Once an audible alarm has been cut off, it automatically resets (and sounds if the alarm condition is still present) after the time period programmed expires. If the audible alarm is again cut off while the same alarm condition is still present, the reset feature is inoperable, and the audible alarm remains silenced. If another alarm condition occurs, the audible alarm again sounds.

Note: *External MCA audible alarm relay contacts are not available if the power system is equipped with a List 12 or List 13 special application MCA.*

1.3.7 Low Voltage Disconnect (if associated components are furnished in a Distribution Cabinet): Protects the battery from complete discharge. Automatically disconnects the battery and system output from the controlled load(s) (LVLD) or battery from system and loads (LVBD) if battery voltage decreases below a preset adjustable value. This can occur during a prolonged commercial AC power failure, where the battery is required to furnish power to the load, and subsequently starts to discharge.

For further information, refer to the description of the Low Voltage Disconnect circuit card under List 21 Features in the *List Descriptions* section of this document.

1.3.8 Local Controls: Refer to the "System Operating Procedures" chapter in the Power System User Instructions (Section 6013) for a complete description.

Location	NAME / Description	Type
MCA	FUNCTION SELECT UP and DOWN	Pushbutton Switches
	FUNCTION SET ENTER	Pushbutton Switch
	FUNCTION SET YES (+) and NO (-)	Pushbutton Switches
	ALARM CUTOFF	Pushbutton Switch

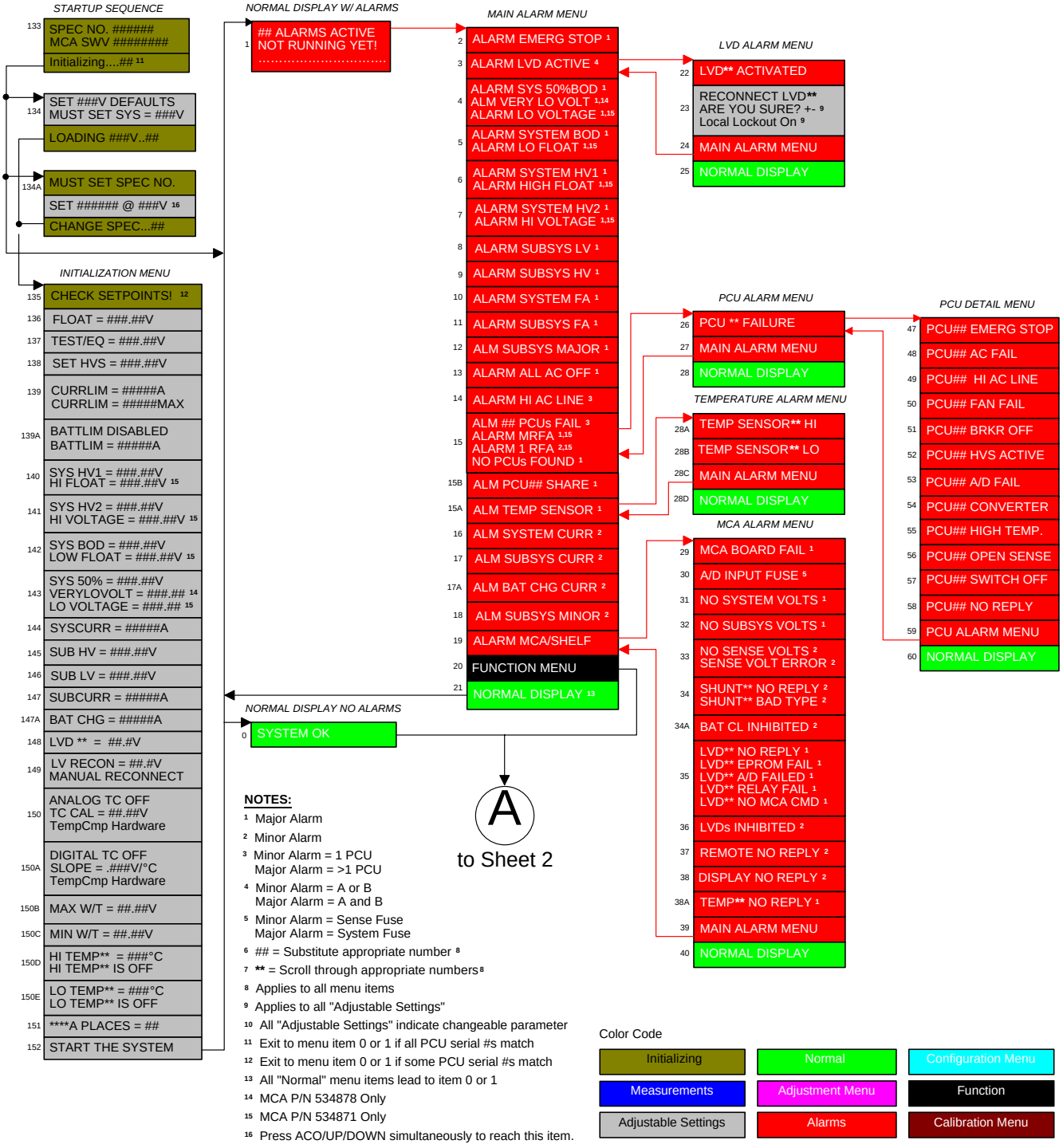
1.3.9 Local Status and Alarm Indicators: Refer to the "System Operating Procedures" chapter in the Power System User Instructions (Section 6013) for a complete description.

Location	NAME / Description	Type
Rectifier Module	See PD588705100/PD588705101/PD588705102/PD588705103/PD588705104.	
MCA	Message Display, Shows... • Active Alarms or "SYSTEM OK" • Various Measurement Items and Values • Various Adjustment Items and Values • Various Configuration Items and Settings • Various Calibration Items and Settings See Paragraph 1.3.10. "MCA Display"	---
	ALARM CUTOFF	LED - yellow
	MAJOR	LED - flashing red
	MINOR	LED - red
	AC	LED - green/red
	TEST/EQ	LED - yellow

Home

1.3.10 MCA Display: The following are illustrations from the MCA Menu Tree (Section 6022). Refer to the latest version of Section 6022 for the most recent MCA Menu Tree. Refer to the "Navigating the MCA" and "System Operating Procedures" chapters of the Power System User Instructions (Section 6013) for complete descriptions of menu items.

NETSURE™ MCA Menu Tree (Sheet 1 of 2)



from Sheet 1

A

NetSure™ MCA Menu Tree (Sheet 2 of 2)

FUNCTION MENU

41 MEASUREMENT MENU
42 SET TEST/EQ MODE
SET FLOAT MODE
TestEq Switch On
43 ADJUSTMENT MENU
44 CONFIGURE MENU
45 CALIBRATION MENU
46 NORMAL DISPLAY

MEASUREMENT MENU

61 SYSTEM ###.##VDC
62 SYS LOAD #####A
63 PCU LOAD #####A
64 SUBSYS ###.##VDC
65 SUB LOAD #####A
65A BAT CHG #####A
BAT CHGCL #####A
BAT DIS #####A
65B T SENSOR** ###°C
66 FUNCTION MENU
67 NORMAL DISPLAY

SYSTEM LOAD MENU

86 SYSLOAD** #####A
87 MEASUREMENT MENU
88 NORMAL DISPLAY

PCU LOAD MENU

89 PCU** LOAD #####A
90 MEASUREMENT MENU
91 NORMAL DISPLAY

SUBSYSTEM LOAD MENU

92 SUBLOAD** #####A
93 MEASUREMENT MENU
94 NORMAL DISPLAY

BATTERY LOAD MENU

94A BAT** CHG #####A
BAT** DIS #####A
94B MEASUREMENT MENU
94C NORMAL DISPLAY

CONFIGURE MENU

73 VERIFY INVENTORY
73A SHARE ALARM OFF
SHARE ALARM ON
EMERG STOP OFF
73B EMERG STOP ON
REMOTE HVS OFF
73D REMOTE HVS ON
DISPLAY ROLL OFF
73C DISPLAY ROLL ON
74 SET PCU ON / OFF
74A LO SPEED FAN OFF
LO SPEED FAN ON
75 NAG MINUTES = ##
AUDIBLE NAG OFF
76 TEST/EQ HRS = ##
TEST/EQ MAN STOP
END TEQ ##.##HRS
76A AUTO EQ DISABLED
AUTO EQ MUL = ##
END AUTO ##.## HR
77 RELAYTEST = ###SEC
77A SET SPANISH TEXT
78 FUNCTION MENU
79 NORMAL DISPLAY

ADJUSTMENT MENU

68 ADJUST SYSTEM
69 ADJUST ALARMS
70 ADJUST LVDs
71 FUNCTION MENU
72 NORMAL DISPLAY

SYSTEM ADJUSTMENT MENU

95 FLOAT = ###.##V
96 TEST/EQ = ###.##V
97 SET HVS = ###.##V
99 CURR LIM = ####A
CURRLIM = #####MAX
99A BATTLIM DISABLED
BATTLIM = #####A
100 100% CURR: ####A
101 ADJUSTMENT MENU
102 NORMAL DISPLAY

INVENTORY MENU

118 PCU** TYPE #####A
PCU** TYPE ####+
NO PCUs FOUND
119 VACANT ****A= ##
****A PLACES= ##
120 SHUNT** TYPE SYS
SHUNT** TYPE SUB
SHUNT** TYPE BAT
NO SHUNTS FOUND
121 LVD** INSTALLED
NO LVDs FOUND
121A ANALOG TC FOUND
T SENSOR** INST
NO TEMP SENSORS
122 SUBSYS INSTALLED
NO SUBSYS FOUND
123 REMOTE INSTALLED
REMOTE ACTIVE
NO REMOTE FOUND
124 UPDATE INVENTORY
PLEASE WAIT...
REPLACE ** PCUs?
125 CONFIGURE MENU
126 NORMAL DISPLAY
127 SPEC NO. #########
128 MCA SWV ########
129 REM SWV ########

ALARM ADJUSTMENT MENU

103 SYS HV1 = ###.##V
HI FLOAT = ###.##V [15]
104 SYS HV2 = ###.##V
HI VOLTAGE = ###.##V [15]
105 SYS BOD = ###.##V
LO FLOAT = ###.##V [15]
106 SYS 50% = ###.##V
VERYLOVOLT = ###.## [14]
LO VOLTAGE = ###.##V [15]
107 SYSCURR = #####A
108 SUB HV = ###.##V
109 SUB LV = ###.##V
110 SUBCURR = #####A
110A BAT CHG = #####A
110B HI TEMP** = ###°C
HI TEMP** IS OFF
110C LO TEMP** = ###°C
LO TEMP** IS OFF
111 TEST RELAYS
TESTING RELAY #
Alarm(s) Active
112 ADJUSTMENT MENU
113 NORMAL DISPLAY

PCU ENABLE MENU

130 PCU** ON:SET OFF
PCU** OFF:SET ON
Energy Mgmt. On
131 CONFIGURE MENU
132 NORMAL DISPLAY

LVD ADJUSTMENT MENU

114 LVD ** = ##.#V
115 LV RECON = ##.#V
MANUAL RECONNECT
116 ADJUSTMENT MENU
117 NORMAL DISPLAY

CALIBRATION MENU

80 CAL SYS = ###.##V
81 CAL SUB = ###.##V
82 RESTORE MFG CAL
83 ANALOG TC OFF
TC CAL = ##.##V
TempCmp Hardware
83A DIGITAL TC OFF
SLOPE = .###V/°C
TempCmp Hardware
83B MAX W/T = ##.##V
83C MIN W/T = ##.##V
83D TCOMP ON SENSOR1
TCOMP ON AVERAGE
TCOMP ON HIGHEST
84 FUNCTION MENU
85 NORMAL DISPLAY

Home

1.3.11 External Alarm Circuits: Nine (9) Form-C alarm relay contacts are provided and mapped by the MCA as detailed in the following table. Alarm relay contacts are rated for 0.5A at 125VAC, 1.0A at 30VDC, and 0.3A at 110VDC. Relay operation can be tested via an Alarm Relay Test feature. When activated, this feature consecutively places each relay in the alarm state for the programmed time period.

- Refer to the "Making Electrical Connections" chapter of the Power System Installation Instructions (Section 6012) for connection details.
- Refer to the "Navigating the MCA" and "System Operating Procedures" chapters of the Power System User Instructions (Section 6013) for alarm conditions. Additional descriptions are provided in a) and b) below.

  a) MCA Audible Alarm: These contacts change state if any alarm condition monitored by the MCA occurs, and are provided for connection to an audible alarm circuit.

  b) Test/Equalize Indication: These contacts change state if the system is placed in the test/equalize mode, locally or remotely.

Power System List No.	**10**	**11**	**12**	**13**
MCA Configuration No.	**534876**	**534877**	**534878**	**534879**
Relay K1	Major Alarm	Major Alarm	Major Alarm	Major Alarm
Relay K2	Minor Alarm	Minor Alarm	Minor Alarm	Minor Alarm
Relay K3	High Voltage 1 Alarm	High Voltage 1 Alarm	High Voltage 1 Alarm	Test/EQ Mode Indication 2
Relay K4	High Voltage 2 Alarm	Rectifier Module Fail Major Alarm	MCA Fail Alarm	Fuse Alarm
Relay K5	Battery On Discharge Alarm	Battery On Discharge Alarm	Battery On Discharge Alarm	Battery On Discharge Alarm
Relay K6	50% Battery On Discharge Alarm	Rectifier Module Fail Minor Alarm	Very Low Voltage Alarm	AC Major Alarm
Relay K7	AC Fail Alarm	AC Fail Alarm	AC Fail Alarm	AC Fail Alarm
Relay K8	Audible Alarm	Audible Alarm	Fuse Alarm	LVD Alarm
Relay K9	Test/EQ Mode Indication	Fuse Alarm	Rectifier Module Fail Alarm	Test/EQ Mode Indication

1.3.12 External Monitoring, Reference, and Control Signals

The MCA is connected to an “Interconnect/LVD Inhibit” circuit card. This circuit card provides spring-clamp type terminals for connection of customer wiring, as described below.

(A) Remote Test/Equalize: All Rectifier Modules can be placed into the test/equalize mode by applying an external ground signal. The Rectifier Modules operate in the float mode when the signal is absent.

(B) External "System Voltage" Meter Reading: Leads can be extended from the Power System to an external voltage source. This is the voltage source the MCA monitors for system alarms and displays as "System Output Voltage".

(C) External Voltage Sensing: Leads can be extended from the Power System to the point at which output voltage is to regulate, such as the battery.

(D) Emergency Shutdown and Fire Alarm Disconnect: Operation of the Rectifier Modules can be inhibited through application of an external ground signal. Manual restart is required (by turning AC power to the Rectifier Modules off then on, or by removing and re-inserting the Rectifier Modules). If low voltage disconnect is furnished, the battery and system output can be wired to also disconnect from the controlled load(s). If List RA is furnished, battery also disconnects from the system.

(E) System Fuse Alarm Input: The system fuse alarm circuit activates when a ±18 to 60 volts DC signal is applied this terminal.

PHYSICAL SIZE INFORMATION

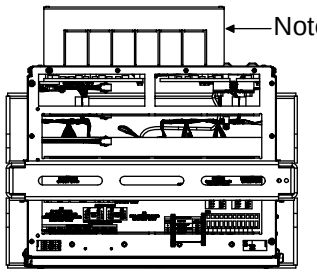
Overall Dimensions

Refer to PD588705100, PD588705101, PD588705102, PD588705103, PD588705104 for Module Mounting Assembly dimensions.

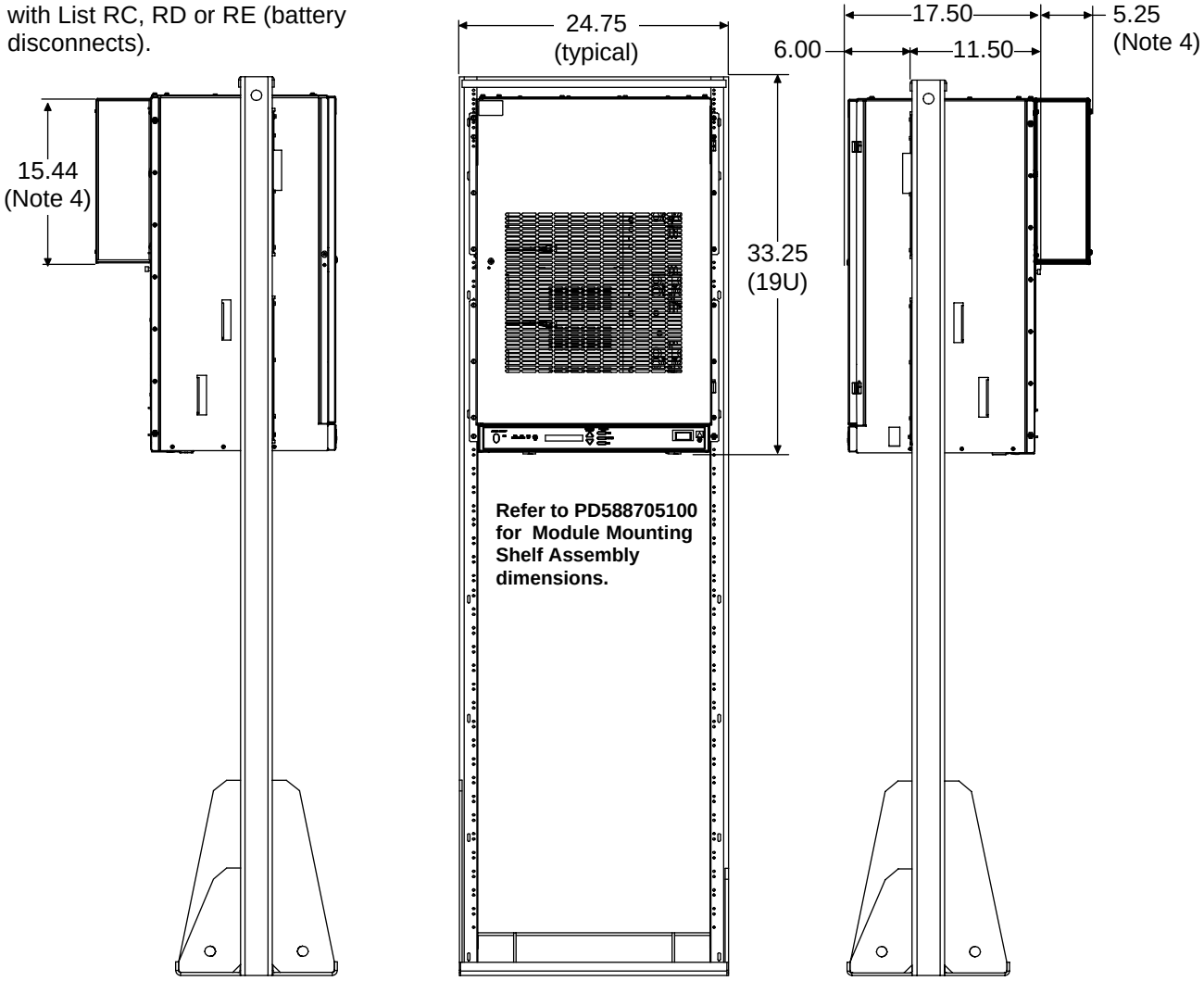
List 24 (Four Bus Row Cabinet)

Notes:

1. All dimensions are in inches, unless otherwise specified.
2. Weight in LBS.
   (minus relay rack)
   Four Bus Row Cabinet
   Net:
   Shipping:
3. Finish: Textured Gray (M500-147)
4. Housing present only if equipped with List RC, RD or RE (battery disconnects).



Top View

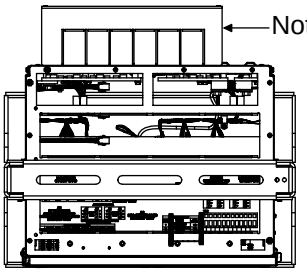


Left Side View | Front View | Right Side View

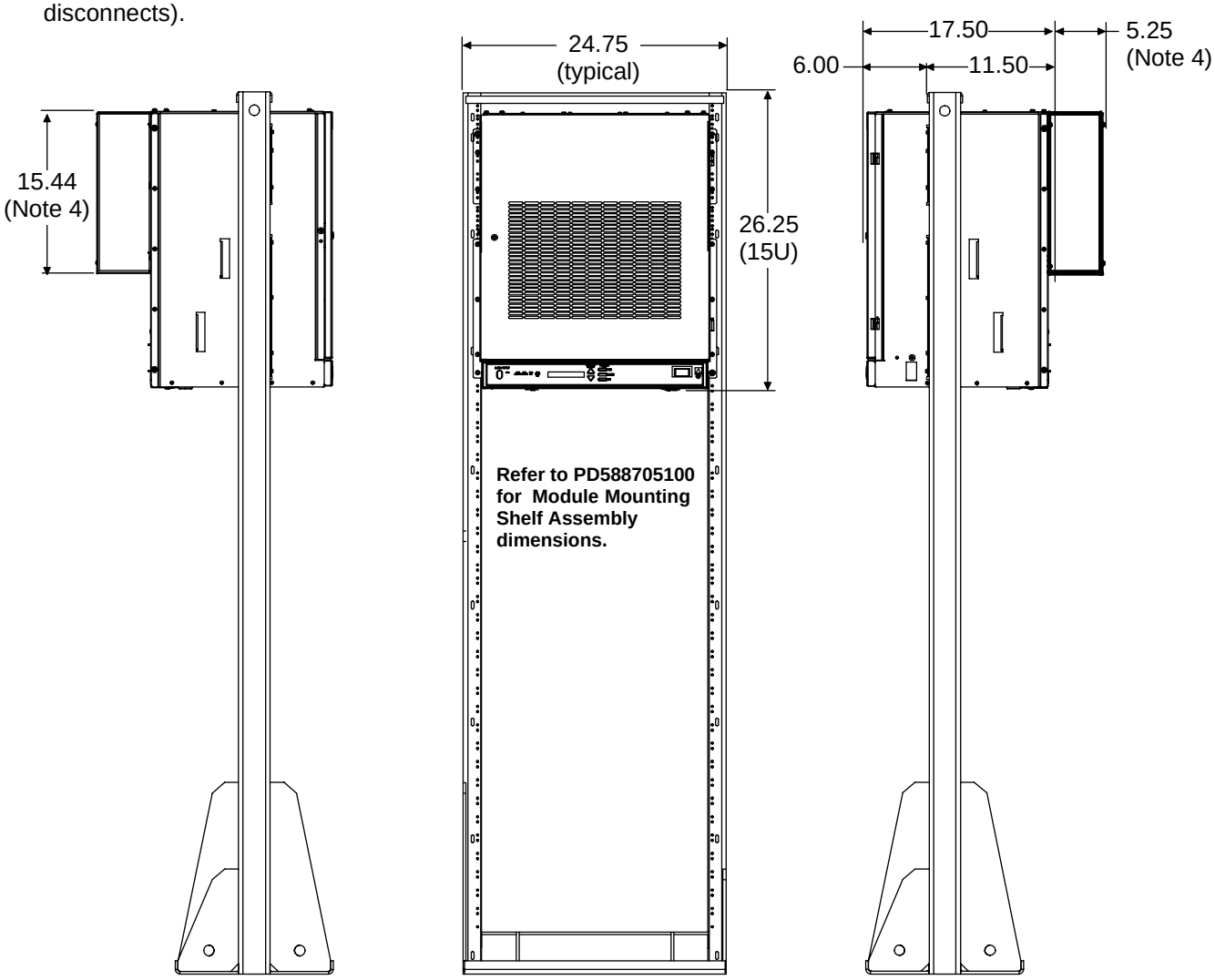
List 23 (Three Bus Row Cabinet)

Notes:

1. All dimensions are in inches, unless otherwise specified.
2. Weight in LBS.
   (minus relay rack)
   Four Bus Row Cabinet
   Net:
   Shipping:
3. Finish: Textured Gray (M500-147)
4. Housing present only if equipped with List RC, RD or RE (battery disconnects).



Top View

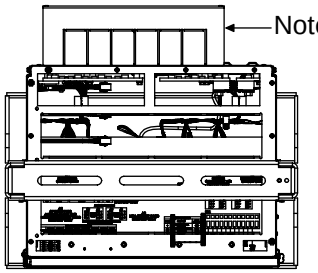


Left Side View | Front View | Right Side View

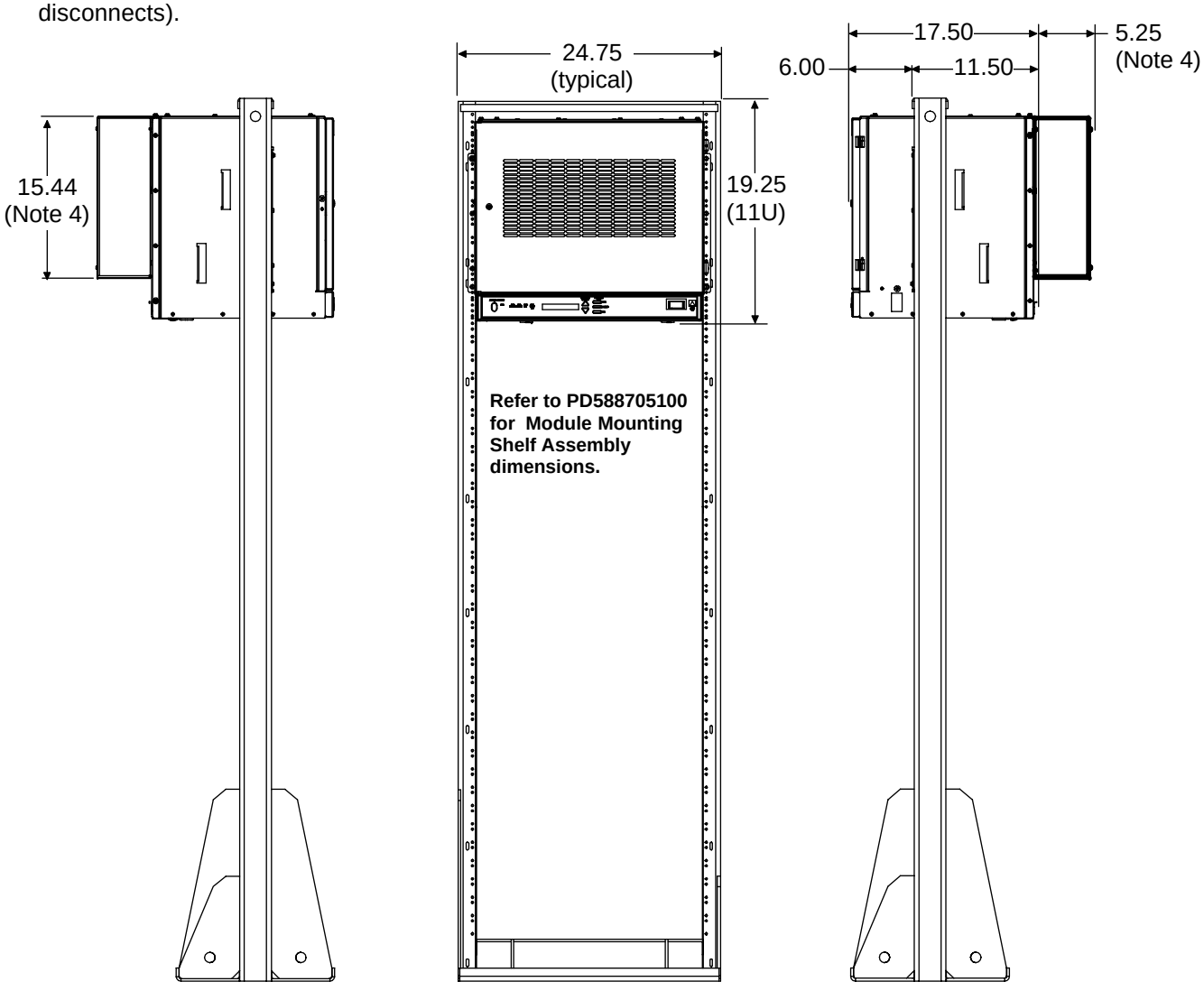
List 22 (Two Bus Row Cabinet)

Notes:

1. All dimensions are in inches, unless otherwise specified.
2. Weight in LBS.
   (minus relay rack)
   Four Bus Row Cabinet
   Net:
   Shipping:
3. Finish: Textured Gray (M500-147)
4. Housing present only if equipped with List RC, RD or RE (battery disconnects).



Top View

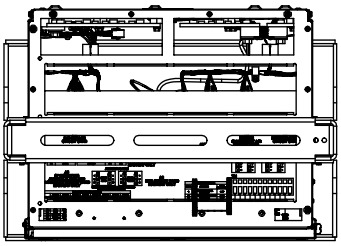


Left Side View | Front View | Right Side View

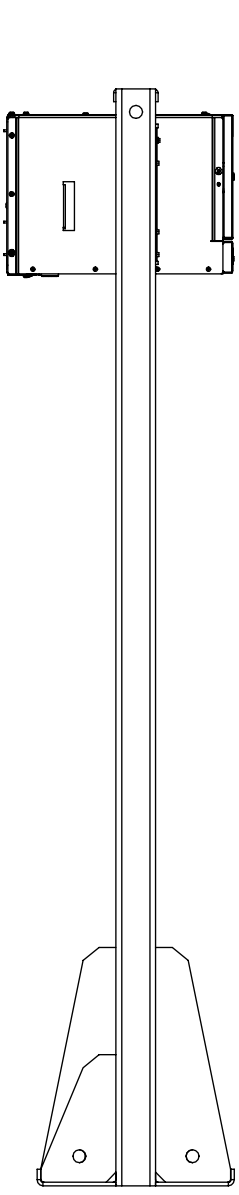
List 21 (One Bus Row Cabinet)

Notes:

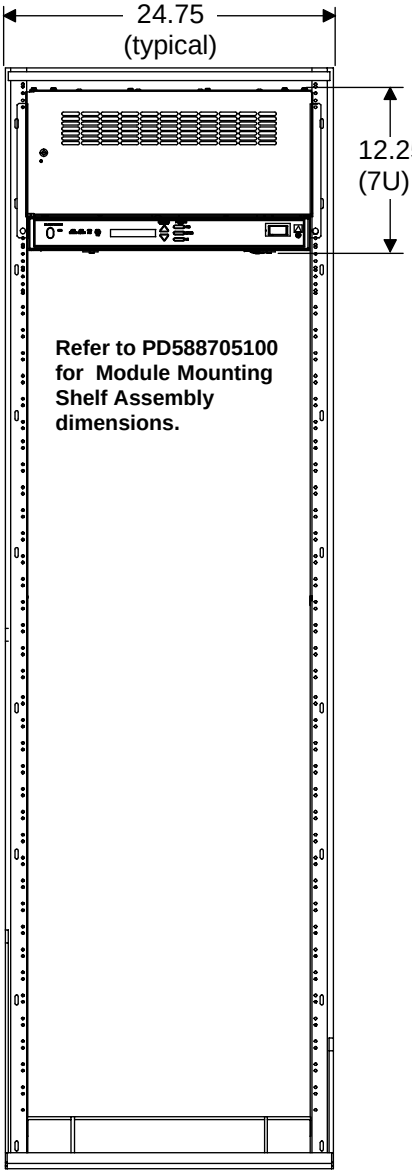
1. All dimensions are in inches, unless otherwise specified.
2. Weight in LBS.
   (minus relay rack)
   One Bus Row Cabinet
   Net:
   Shipping:
3. Finish: Textured Gray (M500-147)



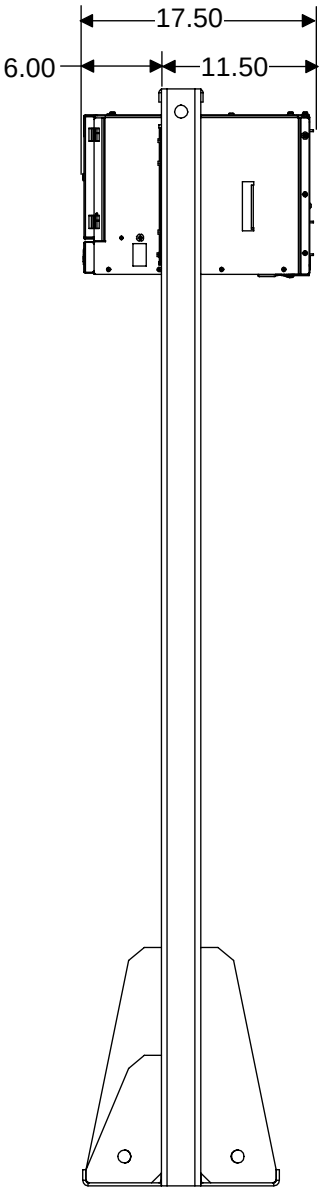
Top View



Left Side View



Front View

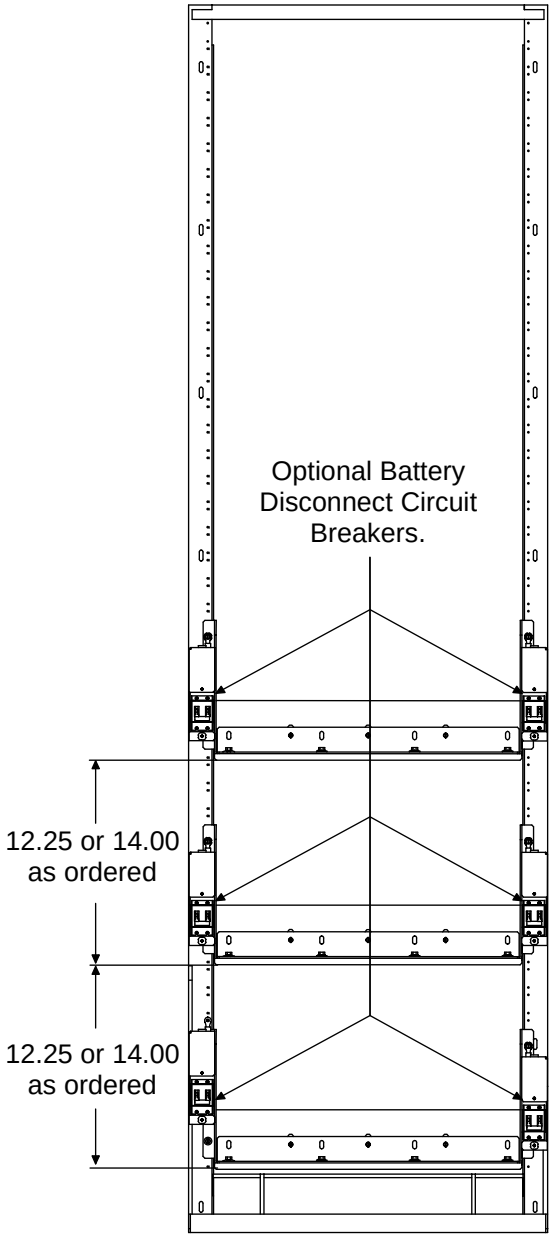


Right Side View

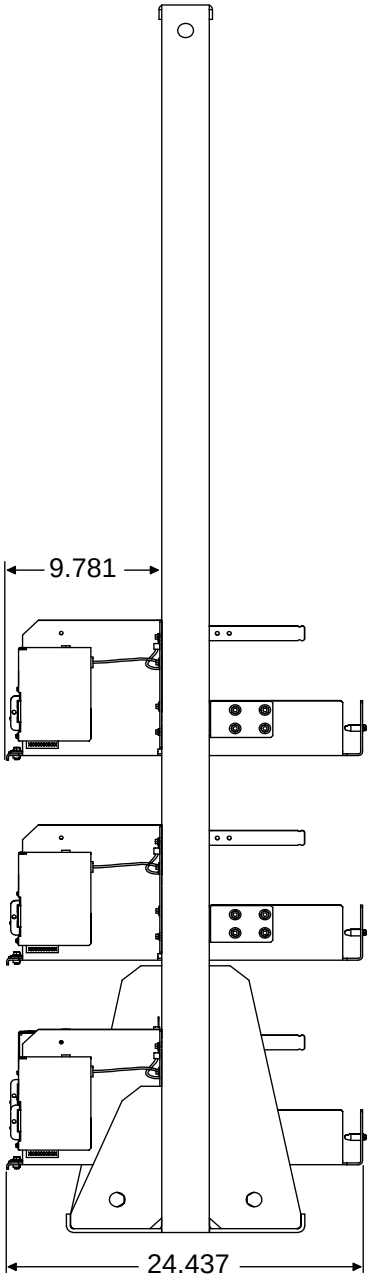
List 93 (Battery Tray)

Notes:

1. Three trays shown as example.
   Max. available per rack: four.
2. Dimensions are in inches.
3. Net Weight Per Tray, Less Batteries:
   With Circuit Breaker Option: 35 lbs.
   Without Circuit Breaker Option: 29 lbs.

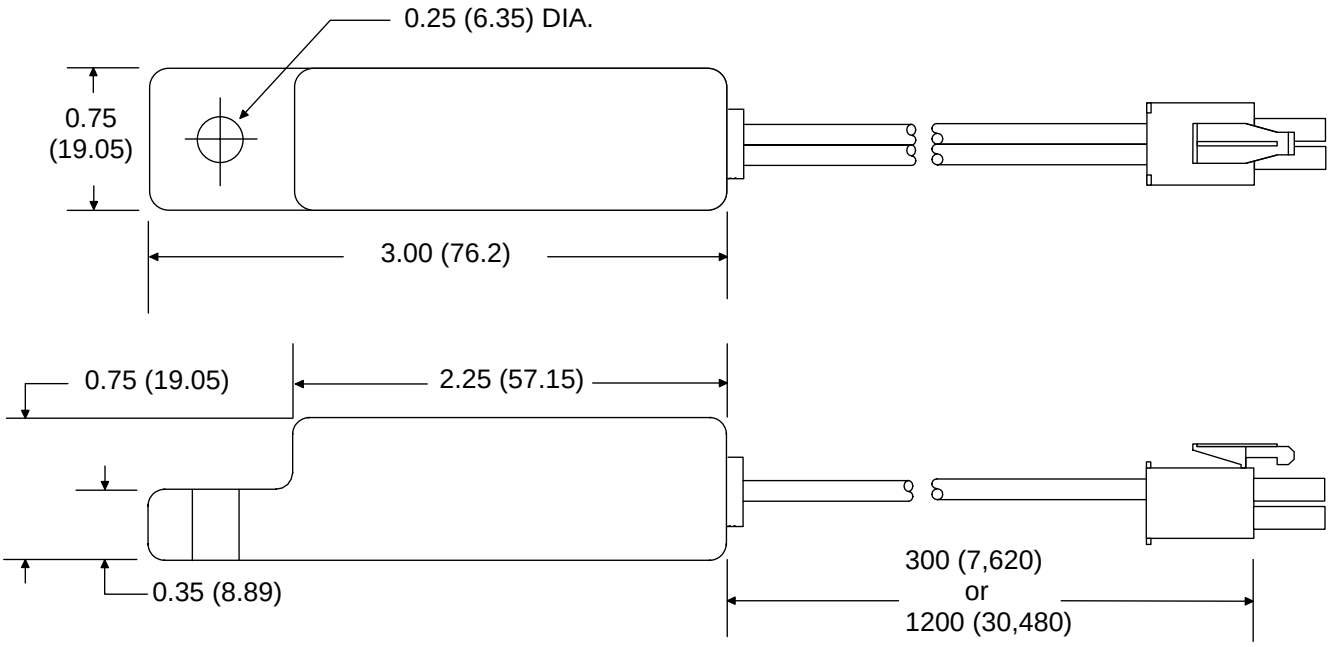


FRONT VIEW



RIGHT SIDE VIEW

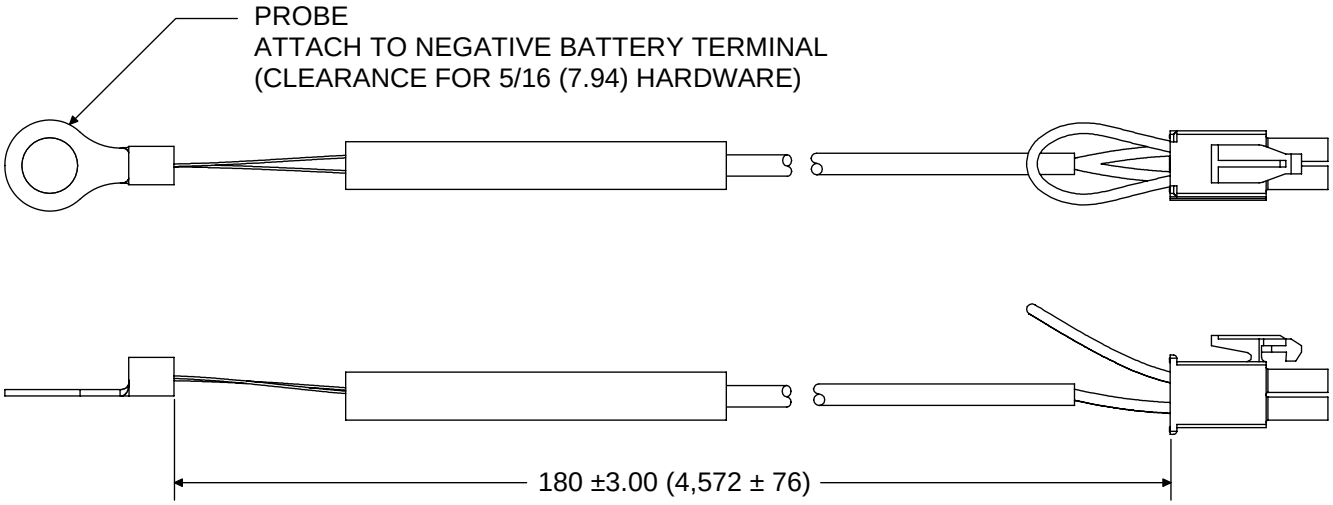
Optional Digital Battery Charge Temperature Compensation Probe (P/N 107021 and 106824)



Part No. 107021 (25 foot)
Part No. 106824 (100 foot)

Note: All dimensions are in inches and (millimeters).

Optional Analog Battery Temperature Probe (P/N 521262)



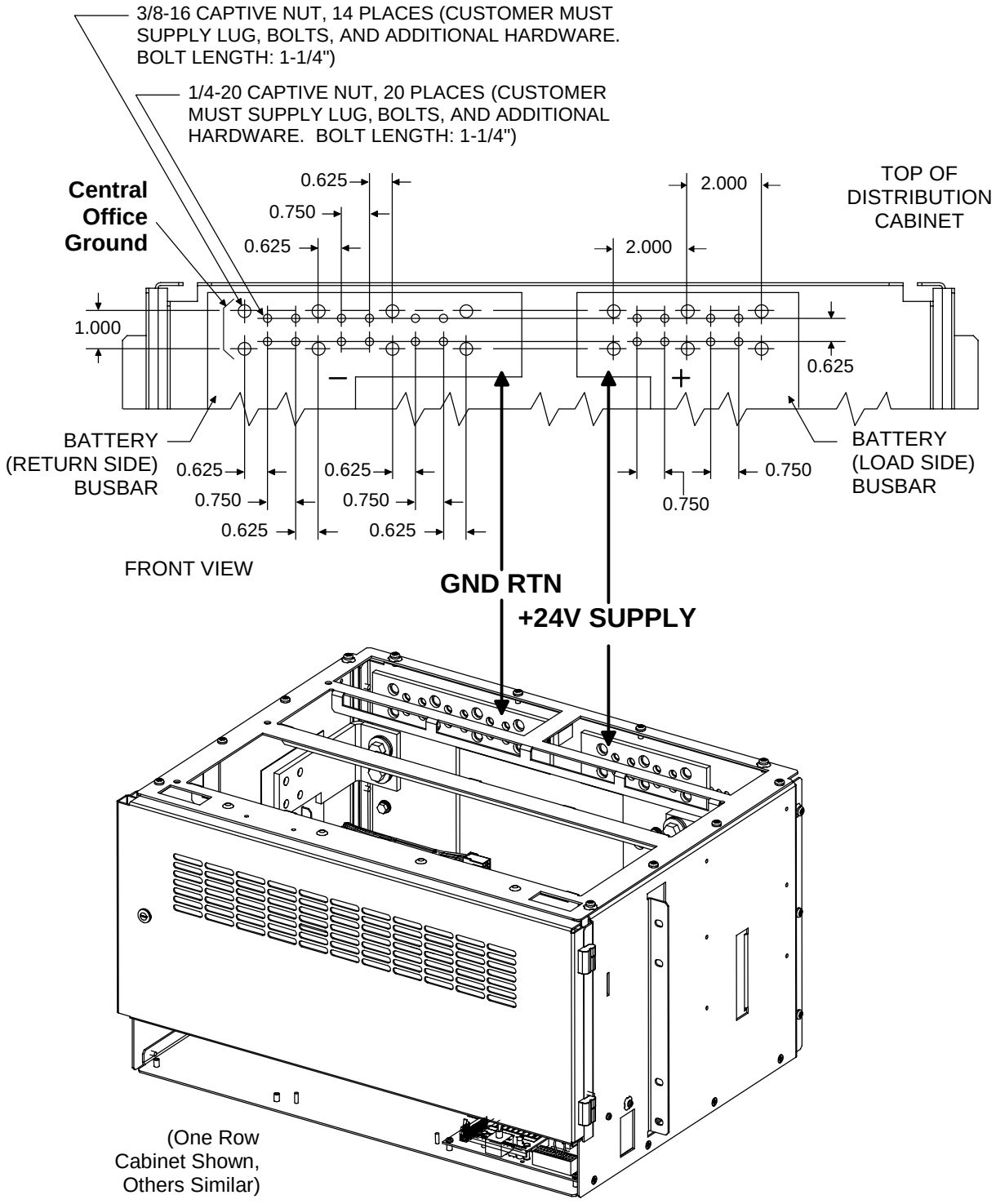
NOTE: All dimensions are in inches and (millimeters).

Electrical Connection Locations and Dimensions

Input Battery

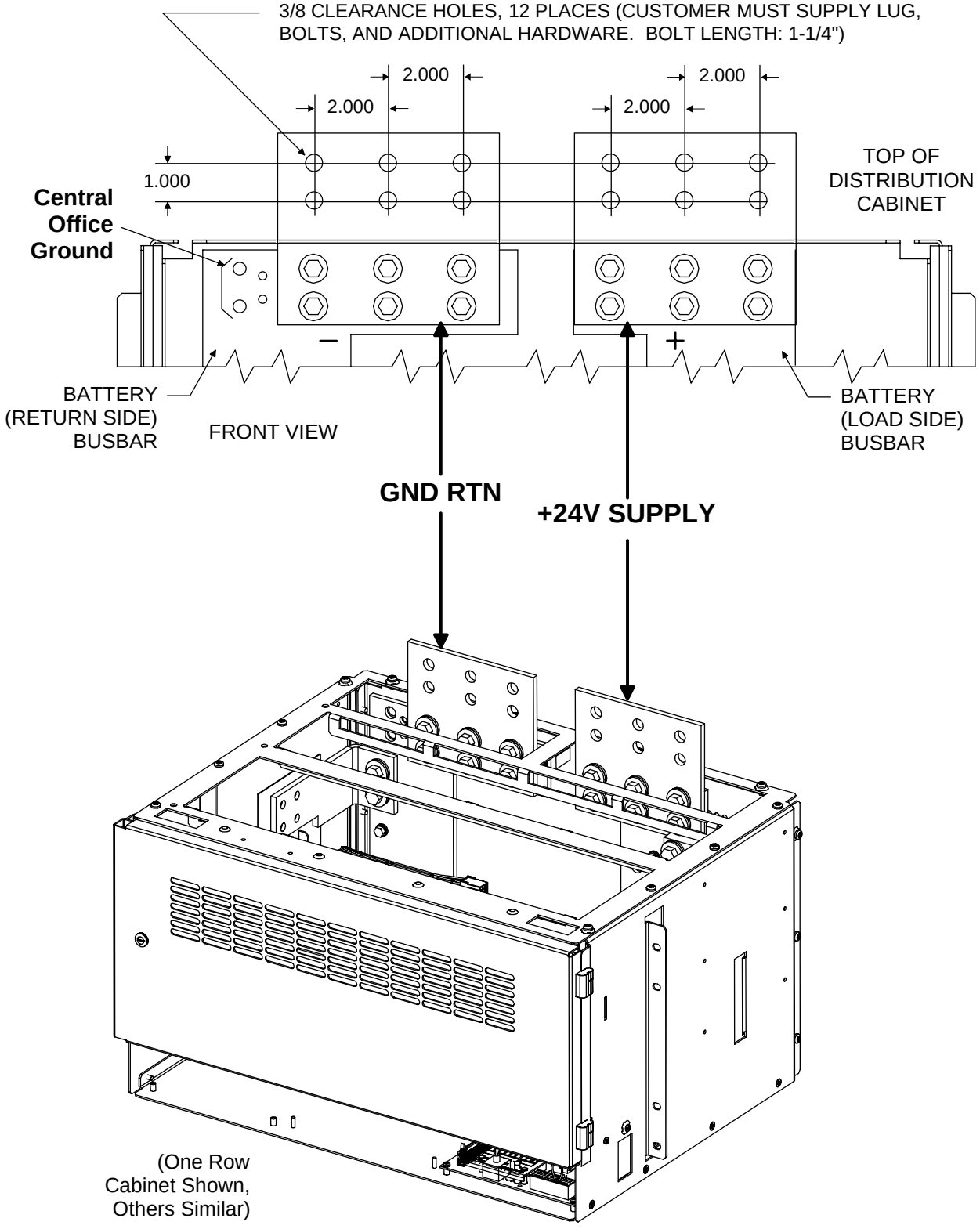
Connections to Lists 21 through 24 Distribution Cabinets

Note: *Battery busbars within distribution cabinets are rated for 2000A max.*
For 2000A-4000A in List 2, make additional battery connections to inter-bay busbars.



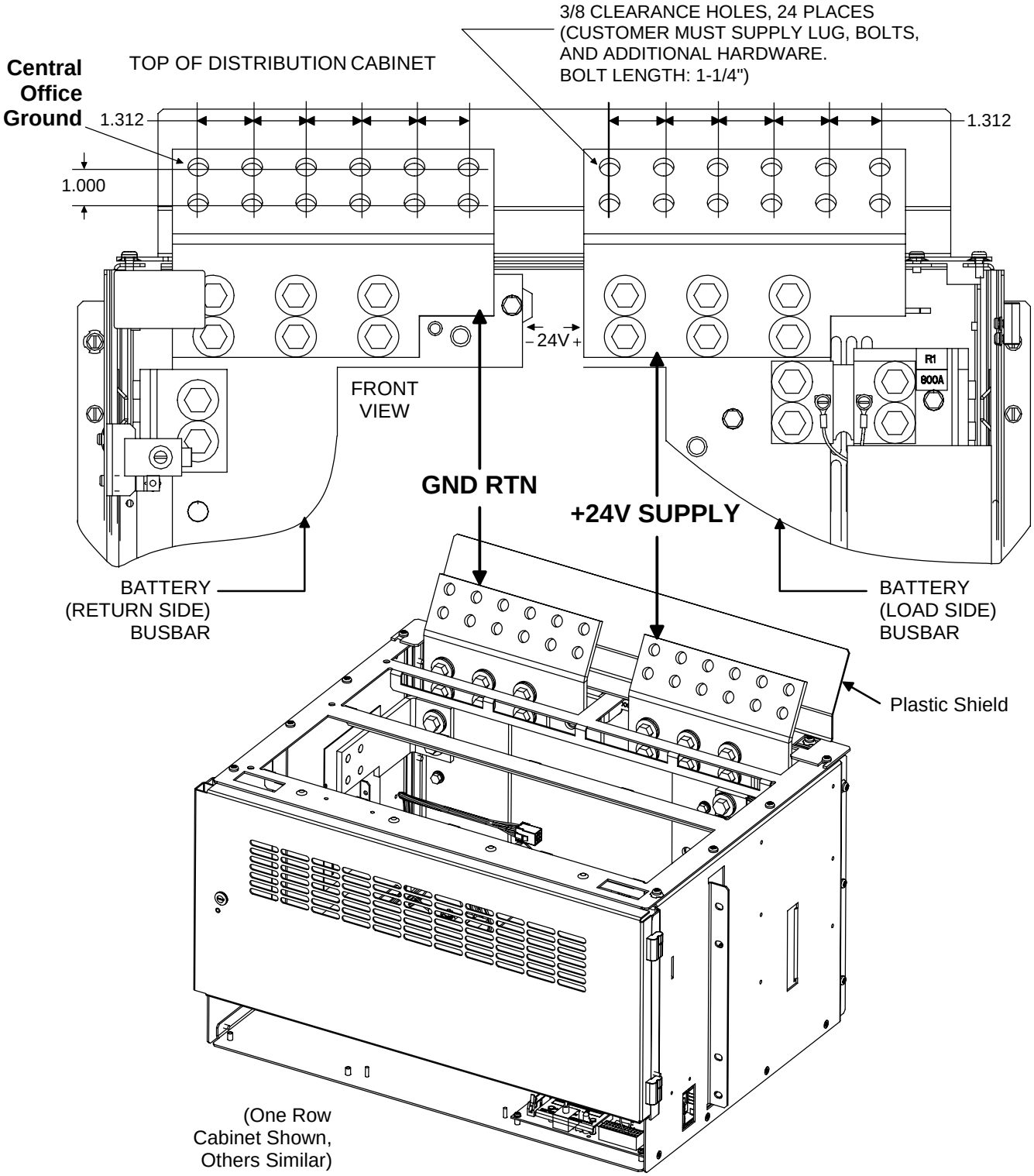
Connections to Optional Battery Busbar Extension Kit P/N 514713 Installed in Lists 21 through 24 Distribution Cabinets

Note: *See Battery Busbar Extension Kit (P/N 514713) under ACCESSORY DESCRIPTIONS for description.*



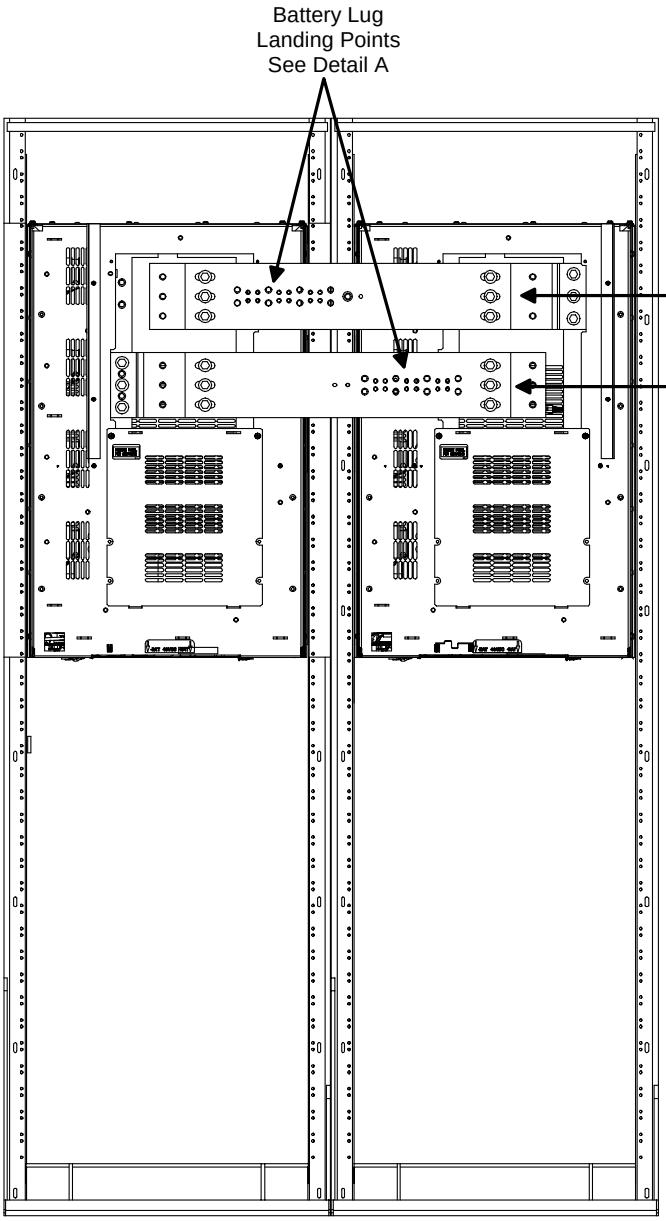
Connections to Optional Battery Busbar Extension Kit P/N 529143 Installed in Lists 21 through 24 Distribution Cabinets

Note: *See Battery Busbar Extension Kit (P/N 529143) under ACCESSORY DESCRIPTIONS for description.*

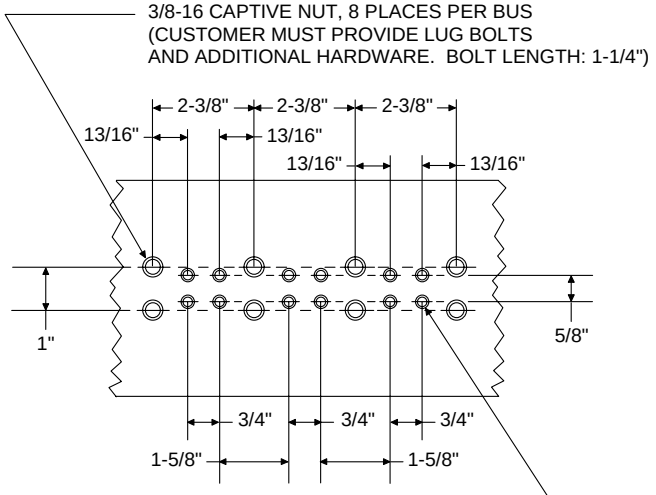


Connections to Inter-bay Busbars (P/O List 2)

Note: *Battery busbars within distribution cabinets are rated for 2000A max.*
For 2000A-4000A in List 2, make battery connections to inter-bay busbars, shown here.



Rear View



DETAIL A

Connections to Battery Disconnect Circuit Breakers and Low Battery Voltage Disconnect Options

Refer to the illustrations located under the Bus Module and Low Battery Voltage Disconnect List descriptions in this document.

Load Distribution

Refer to the illustrations located under the Bus Module List descriptions in this document.

AC Input

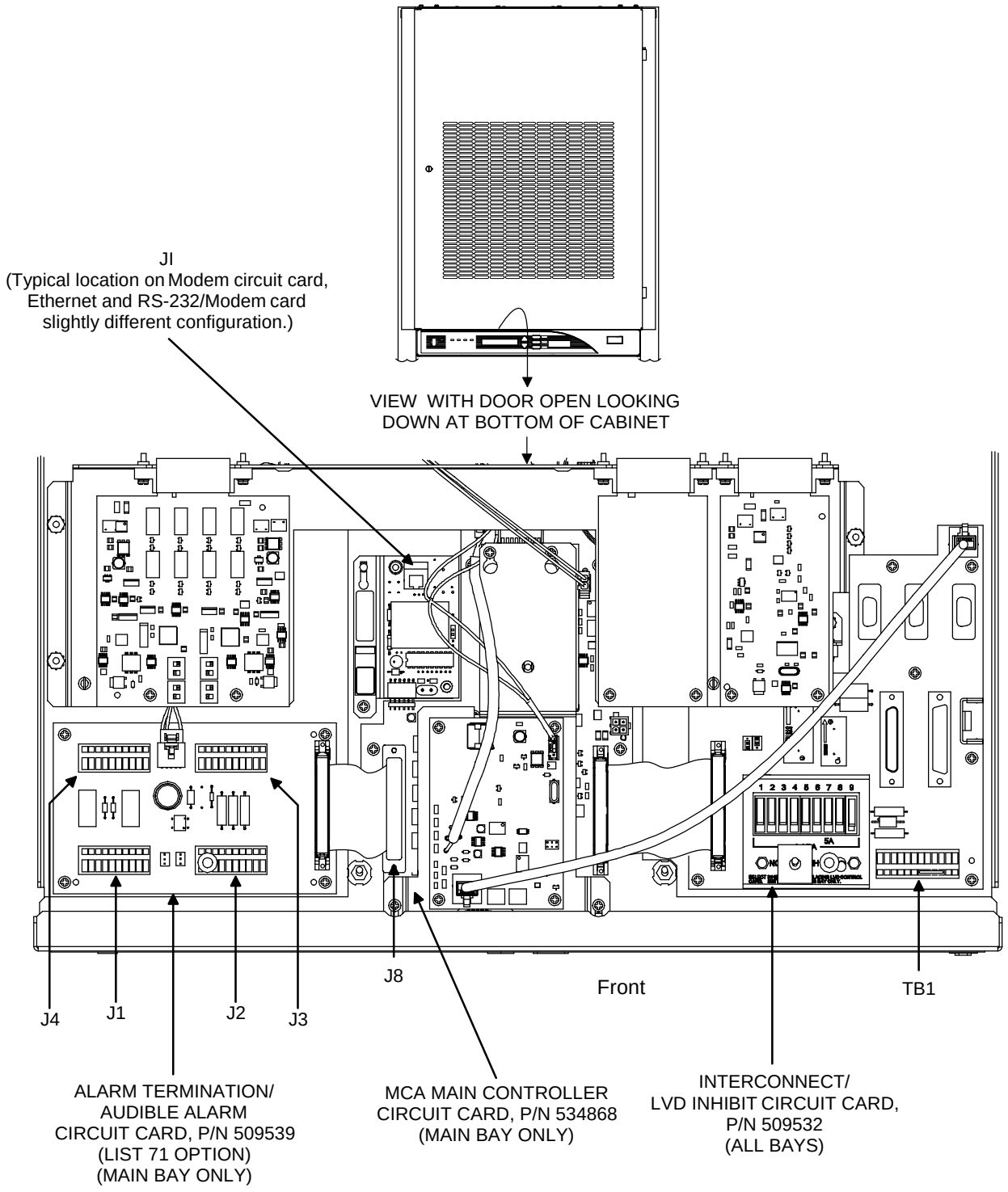
Connections to 588705100, 588705101, 588705102, 588705103, 588705104 Module Mounting Assembly(s)

Refer to the documentation package furnished with the Module Mounting Assembly.

External Alarm, Reference, and Control

External alarm, reference, and control connection points are located on…

- J1-J4 on the optional List 71 Audible Alarm and Alarm Termination Circuit Card P/N 509539,
- TB1 on circuit card P/N 509532, and
- J8 on circuit card P/N 534868 (if List 71 not installed).



Home

RELATED DOCUMENTATION

Power Data Sheets:	PD588705100/PD588705101/PD588705102/PD588705103/PD588705104 (Module Mounting Assemblies) ***(Note:** Power Data Sheet includes all Rectifier Module and DC-DC Converter Module data.)*
Schematic Diagrams:	SD581126000 (NETSURE™ Power System) SD588705100/SD588705101/SD588705102/SD588705103/SD588705104 (Module Mounting Assemblies) SD540827 (1-Row Distribution Cabinet) SD540828 (2-Row Distribution Cabinet) SD540829 (3-Row Distribution Cabinet) SD540830 (4-Row Distribution Cabinet)
Wiring Diagrams:	T581126000 (NETSURE™ Power System) T588705100/T588705101/T588705102/T588705103/T588705104 (Module Mounting Assemblies) T540827 (1-Row Distribution Cabinet) T540828 (2-Row Distribution Cabinet) T540829 (3-Row Distribution Cabinet) T540830 (4-Row Distribution Cabinet)
Color MCA Menu Tree:	Section 6022
Instructions:	Section 6012, System Installation Instructions (NETSURE™ Power System, Spec. No. 581126000) Section 6013, System User Instructions (NETSURE™ Power System, Spec. No. 581126000) Section 5940, Installation and User Instructions (Battery Temperature Probe Concentrator Module, P/N 521211) Section 5949, Installation Instructions (MCA Interface Option Kits) Section 5982, User Instructions (MCA Ethernet Interface Option - Using Ethernet Card Web Interface)
Load and Battery Lug Detail Drawings:	031110100 031110200 031110300

BATTERY MANUFACTURER INFORMATION

Some equipment described in this System Application Guide is designed to accommodate batteries from various manufacturers. The following are referenced in this document.

C&D: C&D Technologies, Inc., Powercom Div., 1400 Union Meeting Road, Blue Bell, PA 19422-0858

Deka®: East Penn Mfg. Co., Inc., Lyon Station, PA 19536-0147

Douglas®: Douglas Battery Mfg. Co., 500 Battery Dr., Winston-Salem, NC 27117-2159

Fiamm: FIAMM T.I, 23880 Industrial Park Drive, Farmington Hills, Detroit, MI 48335

Marathon™: GNB Industrial Power, a Division of Exide Technologies, Princeton, NJ 08543.

Northstar: NorthStar Battery Co. LLC, 4000 Continental Way, Springfield, MO 65803

PowerSafe Enersys™: EnerSys Inc., Reading, PA, 196212-4145

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REVISION RECORD

Issue	Change Number (ECO)	Description of Change	Date	Approved
AA	LLP210771	New	06/30/08	John Jasko
AB	LLP211402	List 93 Battery Tray spacing changed from 7U to 8U for P/N 122018 battery. Misc. Updates.	09/30/08	John Jasko
AC	LLP212882	Fan Failure statement added for NEBS.	09/28/09	John Jasko
AD	LLP212840	List 92 (Battery Stand System) added.	11/23/09	John Jasko John Jasko Dec 4, 2009 Rich Trifiletti Dec 7, 2009

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